

IMS Learning Design

Defining Collaborative & Multi-Role Learning Experiences using the IMS LD specification (May the 12th, 2004)



Colin Tattersall, The Open University of The Netherlands

Overview

- 10:15 Welcome, objectives for the day, introductions
- 10:30 Today's e-learning landscape
- 10:45 Modelling Units of Learning: Part I
- 11:30 Tea/Coffee Break
- 11:45 Modelling Units of Learning: Part II
- 13:00 Lunch
- 14:00 Putting IMS LD into practice
- 14:30 Case study: Part I
- 16:00 Tea/Coffee Break
- 16:30 Case study: Part II
- 17:15 Current Developments
- 17:45 Summary and reflection on the day
- 18:00 Close

Introductions: Colin Tattersall

- Background in Computer Science, Help Systems Research, XML, e-learning specifications;
- Involved in Learning Design spec., QTIv2
- The Open University of the Netherlands (OUNL)
 - Started in 1984; national institute;
 - Open distance education provider
 - 7 faculties, 24000 students
 - 24 study centres in Netherlands and Belgium
 - education delivered using a variety of technologies (print, cd-rom, internet, face to face contact sessions, practical rooms, etc.)
 - Required to innovate education

Introductions: Steve Griffin

- 19 years in the educational technology area and a Co-founder of IMS.
- Executive Director of Developer and Adopter Services helping promote the take up of standards-based elearning.

Introductions: Participants

- Andrea Lorenzon
 - Lisa Pilati
 - Ulrich Woermann
 - Iliana Nikolova
 - Simon Skrede
 - Christian Herrmann
 - Bern Dorn
 - Erik Wallin
 - Solana Ramazzotti
 - Carla Falsetti
 - Alexander Little
 - Elisa Lucatelli
 - Elena Jikhomirov
 - Clara Navas
 - Mariangela Pisani
-
- If you could state your name, organisation & country
 - E-learning tool developer or provider or instructional designer or none of the above?
 - Experience with e-learning specs? IMS LD? XML?

Objectives

- Audience
 - Instructional Designers, eLearning Content Publishers and Tool Developers
- Objectives:
 - To explain what the IMS Learning Design Specification is, why it was written and how you can make use of it.

Couple of preliminary remarks

- We won't create XML files (although we will see some XML fragments)
- We will all collaborate in a running, pre-created learning experience then dissect its essentials

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Today's e-learning landscape

- Many learning providers have e-learning as part of their strategy;
 - Both distance and residential learning providers
- Many suppliers of e-learning tools and content;
 - Monolithic/all-embracing suites (Virtual Learning Environments - VLE)
 - Components (assessment engine, course delivery engine, ...)
 - Content: PDFs, HTML, XML, Flash,
- E-learning content/system diversity both between and within organisations
 - Pedagogical diversity too

Today's e-learning landscape

- Room for improvement in interoperability
 - Not yet easy to run my e-learning course (developed for my situation) in your situation
- A high level of interest in specifications and standards for e-learning
 - Rationale: adoption brings benefits in exchange of e-learning content, plugging-and-playing of different software components, avoidance of vendor lock-in, ...

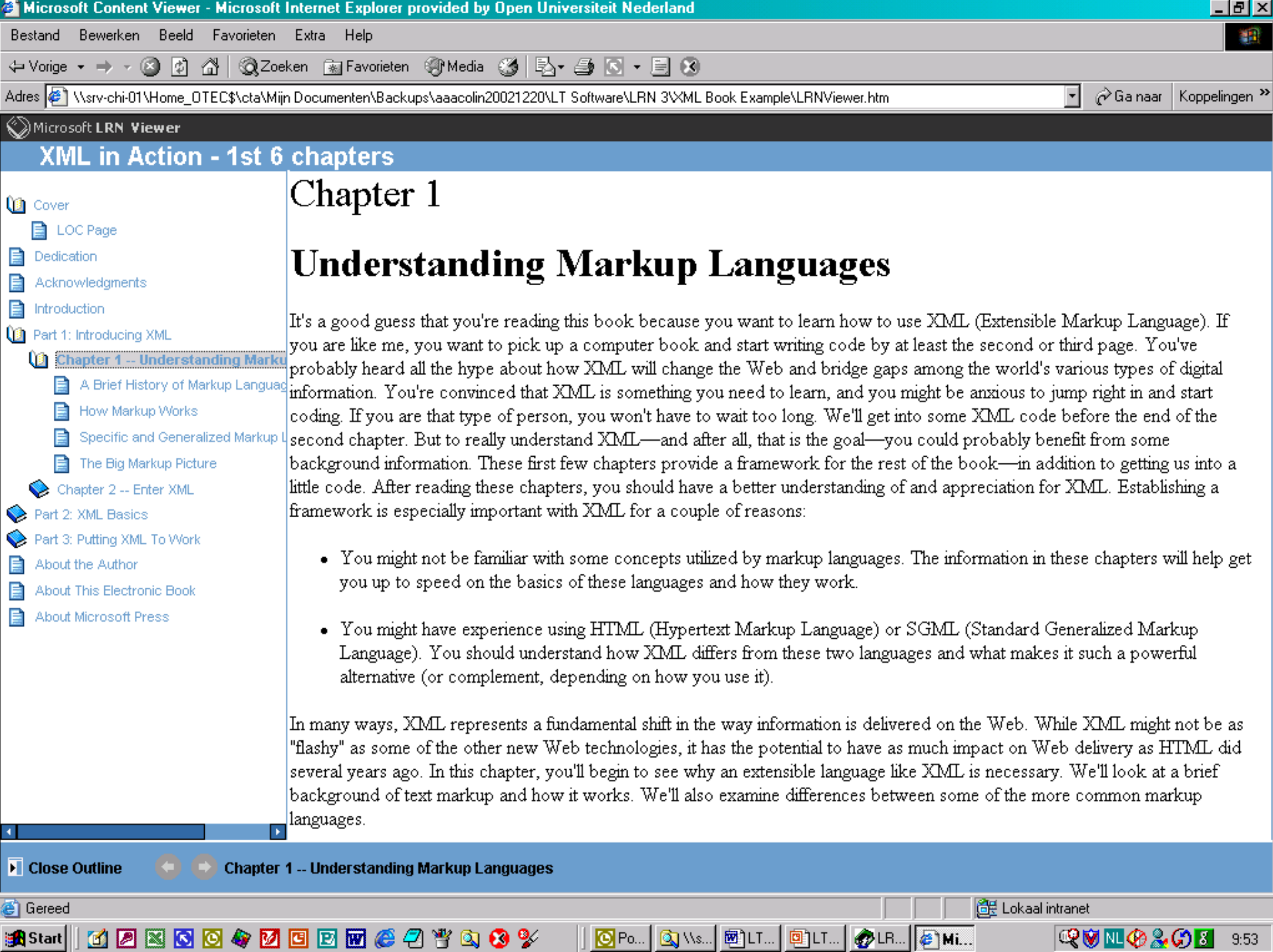
IMS Global Learning Consortium, Inc.



- www.imsglobal.org
- Formed in 1997, two goals
 - “Defining the technical specifications for interoperability of applications and services in distributed learning”
 - “Supporting the incorporation of the IMS specifications into products and services worldwide”
- OUNL is contributing member (voting rights)
 - Also Apple, Blackboard, Microsoft, WebCT, Cisco, Sun, Texas Instruments, ...+/- 60 members
- (The IMS Learning Design specification is at
 - <http://www.imsglobal.org/learningdesign/index.cfm>)

E-learning specifications

- My first steps in the world of e-learning specs ...
- Downloaded Microsoft's LRN 3.0 Toolkit
 - IMS Content Packaging
 - IMS Meta-data
- Downloaded all example content packages
- Things were looking good



Updating Support Skills from NT 4.0 to Windows 2000

Overview

- About this Course
- Module Overview
- Student Prerequisites
- Credits
- Microsoft Certified Professional Program
- Hardware and Software Requirements
- Copyright Information

Module 1: Introduction to Microsoft Windows 2000

- The Windows 2000 Platform
- Windows 2000 Professional
- Windows 2000 Server
- Windows 2000 Advanced Server**
- Windows 2000 Datacenter Server
- Module 1 Review

Module 2: Installing Microsoft Windows 2000

Module 3: Implementing DNS in Windows 2000

Module 4: Exploring Active Directory

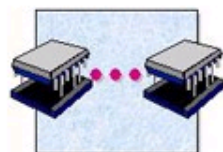
Windows 2000 Advanced Server includes all of the same features as Windows 2000 Server, plus additional features that provide a highly scalable, interoperable, available, and manageable operating system.

In addition to providing the features in Windows 2000 Server, Windows 2000 Advanced Server includes:



Enterprise Memory Architecture

Allows applications that perform transaction processing or decision support on large data sets to keep more data in memory, for greatly improved performance. Windows 2000 Advanced Server supports physical memories of up to 32 GB on Alpha-based computers, and up to 8 GB on Intel-based computers.



SMP Scalability

Supports up to eight processors.



Windows Clustering

Allows you to connect multiple servers to form a cluster of servers that work together as a single system. Windows Clustering provides the following benefits:

- **High Availability.** Provides high availability for mission-critical applications, including the ability to automatically detect the failure of an application and quickly restart it on a different server. In addition, when one server in the cluster fails, another server in the cluster can be used to restore service to users.
- **Network Load Balancing.** Provides high availability and scalability for network-based services, such as TCP/IP and Web services.

Smartforce LRN Sample - Basic Concepts of Exchange 2000 Server

- Introduction to Exchange 2000 Server
 - Overview of Exchange 2000 Server
 - Messaging systems
 - Design goals of Exchange 2000 Server
- Storage architecture
 - Database file structure
 - Data recovery and transaction logs
 - IFS and public folders
 - Indexing**
- Routing architecture
- New features

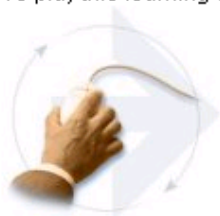
e Indexing

Learning Objective

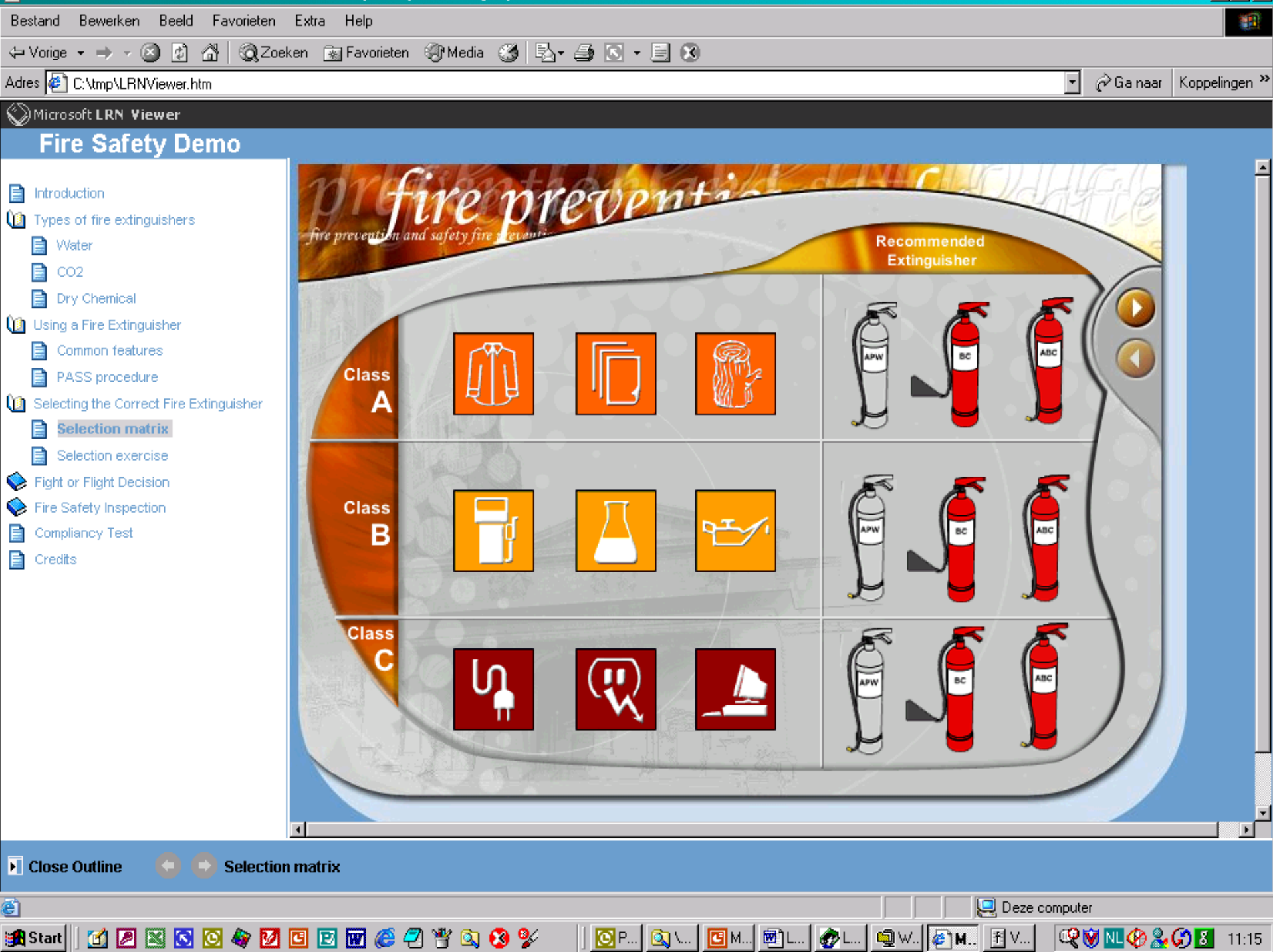
- describe how indexing works.

Launch









To play this learning object, click the [Launch Object](#) button.

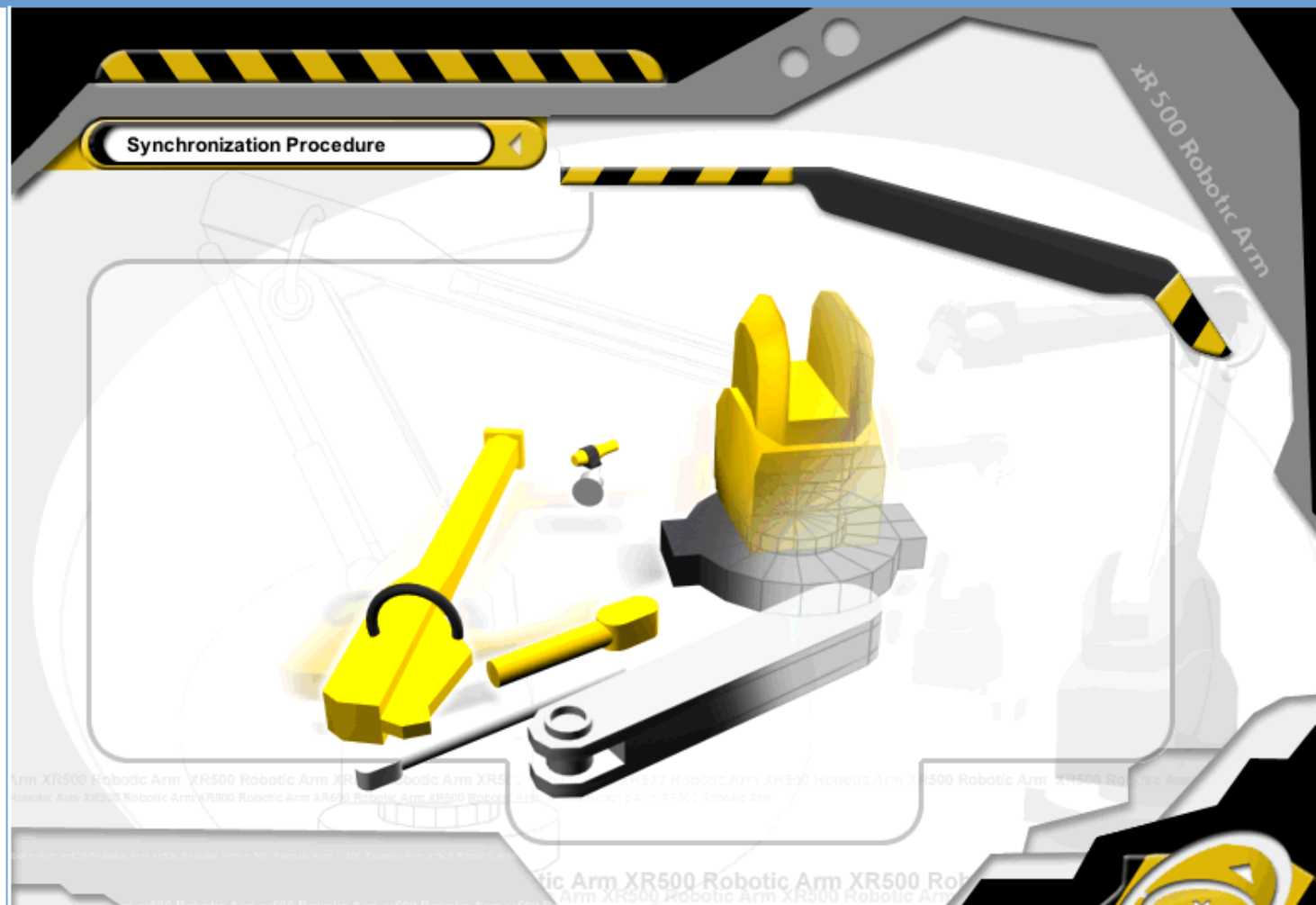


Launch Object



xR 500 Robotic Arm

-  Overview
 -  xR 500 Mechanics
-  Procedure
 -  **Introduction**
 -  Procedure
 -  Conclusion
-  Simulation
-  Credits



Things were looking good, but ...

- Some engaging content, but each example seemed to be a slight variation of the previous;
- Learning felt like (only) consuming content
- Support often looked like page-turning
- There are other approaches to (e-)learning ...

From Learning Objects to Learning Activities

- What about situations in which learning happens without learning objects?
- What about when several learners cooperate to solve a problem?
- Where are the teachers and staff?
- Need a way of describing the whole teaching-learning process, not just the learning objects involved
 - pedagogy, *the act or process of teaching*
- Interoperability of e-learning content & processes

Overview

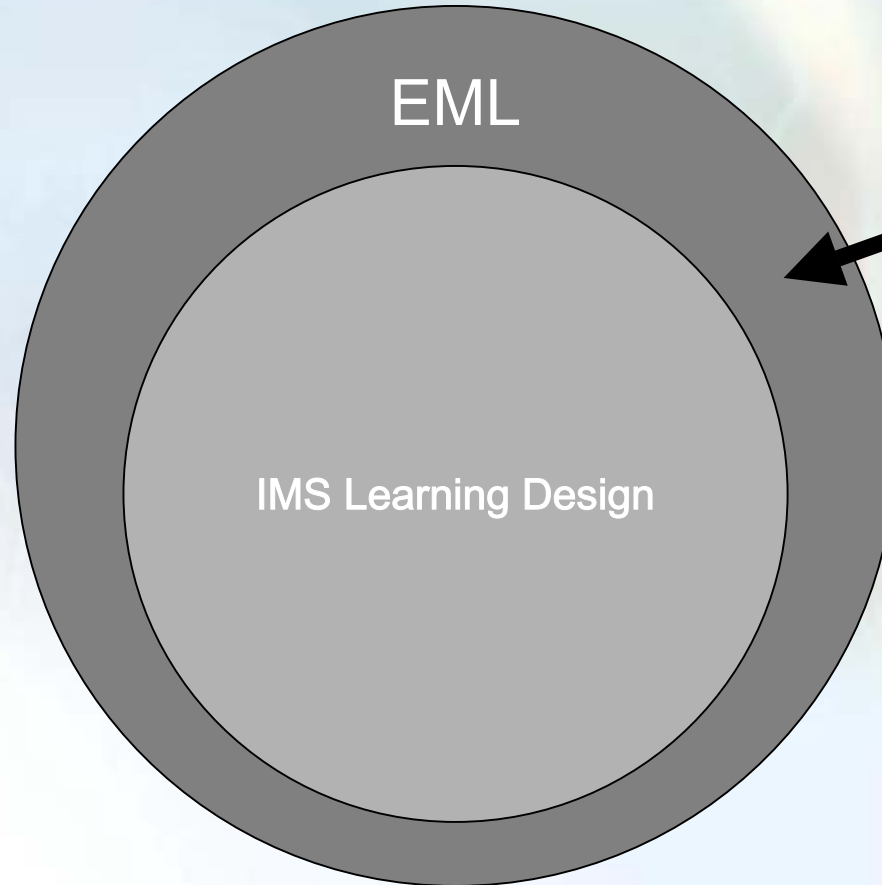
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History: Educational Modelling Language

- Language for describing **Units of Learning**
 - All the content and processes needed in learning something
- Developed by OUNL in the late nineties
 - Specification made generally available December 2000
- Brought into the standardisation process via IMS in 2001
- Approved as IMS Learning Design 1.0 on February the 10th 2003
 - EML no longer maintained or updated
 - EML and IMS Learning Design are very similar, though there are some differences ...

EML and IMS Learning Design

**Two versions of
EML: 1.0 & 1.1
(the software
we will use
later today
runs EML 1.1)**



**Assessments,
interactions,
content, ...**

**Most experience
to-date in
educational
modelling is with
EML ...**

What IMS LD is not

- Not a programming language
 - ... *although some characteristics are shared*
- Not an instructional method
 - ... *can be used to describe many methods*
- Not pedagogically neutral in the sense of not caring about pedagogy
 - ... *rather it requires the designer to be explicit about his/her pedagogical choices in the learning process*
- Not a guarantee of good education
 - ... *can use it to describe poor learning processes*

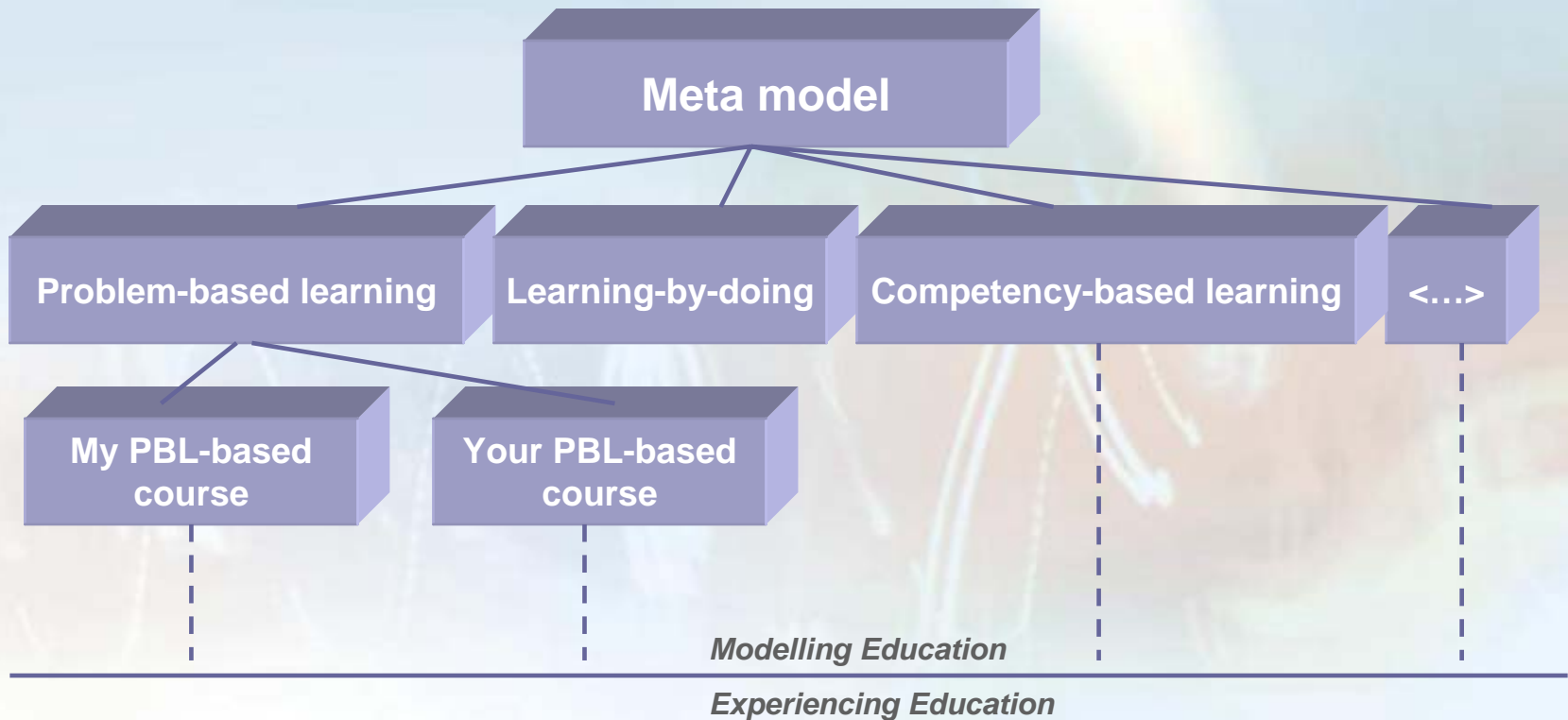
What is IMS LD then?

- IMS Learning Design is used to model units of learning
 - A unit of learning (**UoL**) is any delimited piece of education or training, such as a course, a module, a lesson, etc.
 - more than just a collection of ordered resources to learn
 - activities, assessments, services and support facilities provided by teachers, trainers and other staff members.
- Who does what, when, with whom and using which learning objects and services?
- A model of the activities, content, tools and workflow for learners and staff to accomplish one or more learning objectives

What's a model and what use is it?

- Learning processes are described (who does what, when, etc) using the concepts in the IMS LD language;
 - For example, we can create a model of problem based learning
- These models are 'played' in an IMS-LD-aware player;
 - Analogous to marking-up learning materials in HTML and having a browser interpret them
- Interoperability of e-learning processes
- (In fact, the IMS LD language is itself a model, but at a more abstract level: a meta-model)

Model levels

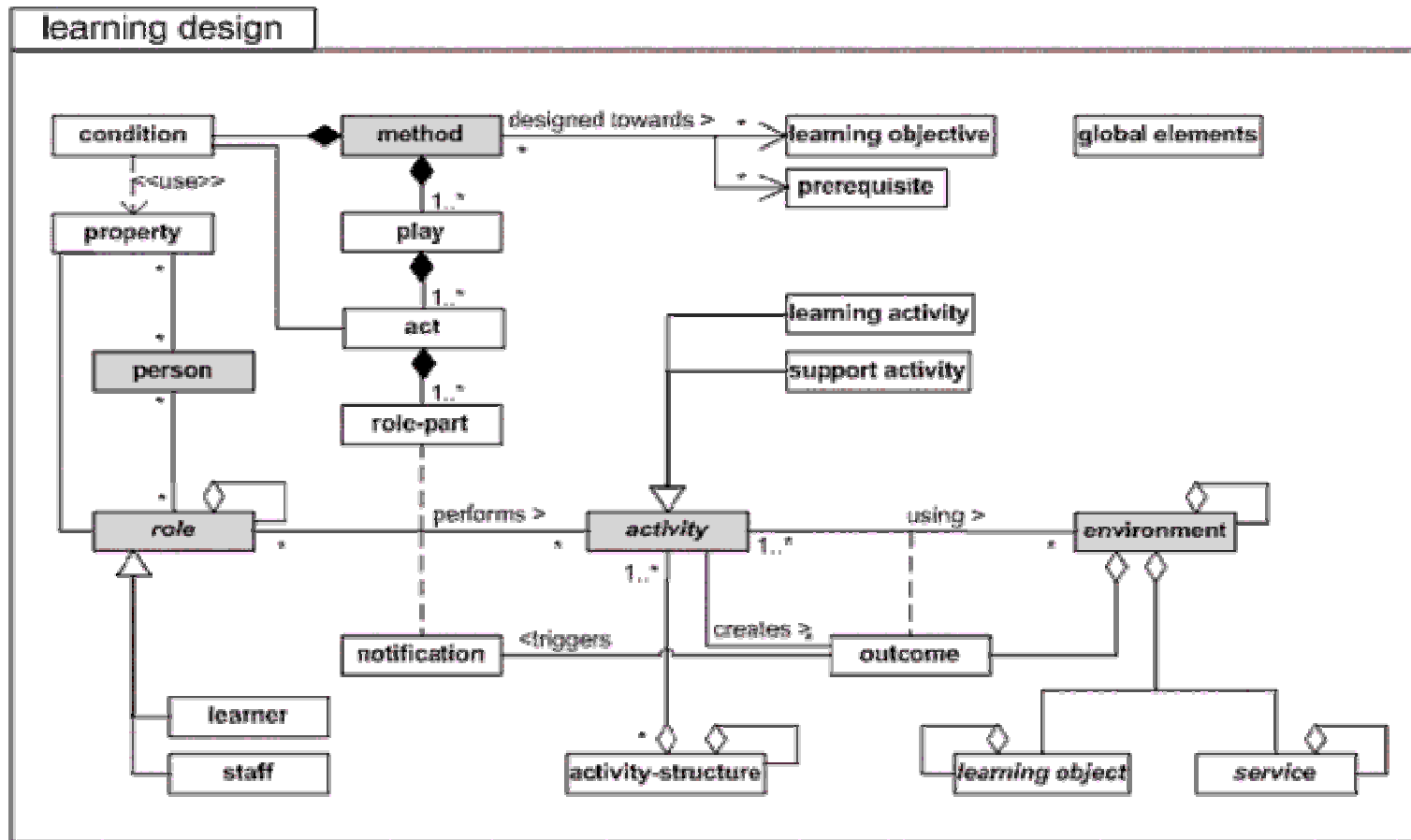


Playing a model: Specific learners in particular roles carrying out activities....

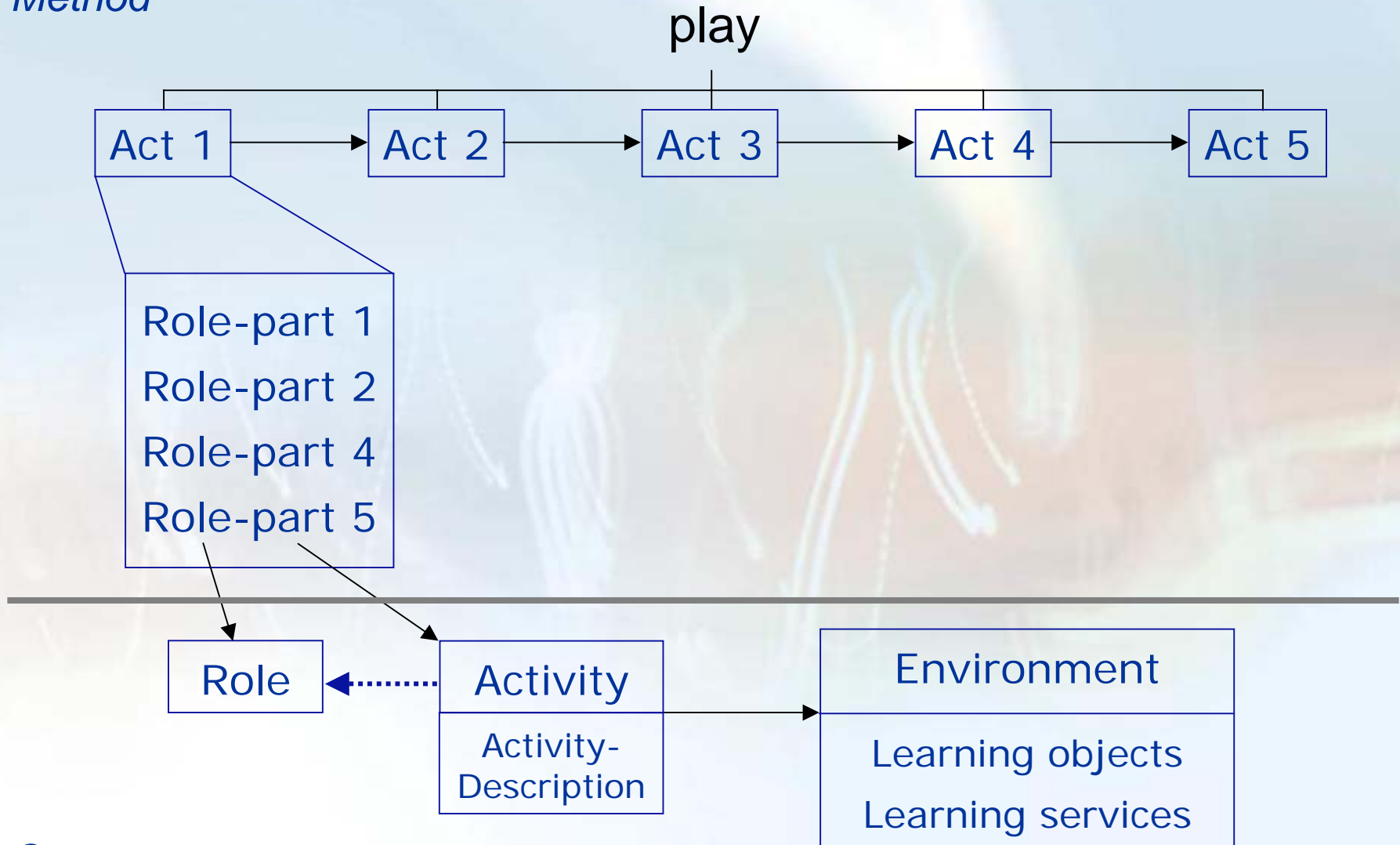
IMS Learning Design meta-model

- Stage-play metaphor
 - People act in different **roles**
 - working towards certain **objectives**
 - by performing **learning and/or support activities**
 - within an **environment**, consisting of **learning objects and services** used in the performance of the activities.
- or, if you speak UML ...

IMS Learning Design meta-model



Method



Components

The learning design process (1)

- Starting point is a narrative description of some educational process
 - “Students are presented with some information on Italian Wines. The tutor is available to take questions ...”
 - “The lecturer posts a problem on the bulletin board. Each group of learners elects a spokesperson who summarises the problem and clarifies”
 - “Think about your experiences as a school child, creating three statements which should be typed into a document and stored on the shared space. Once this is done,”

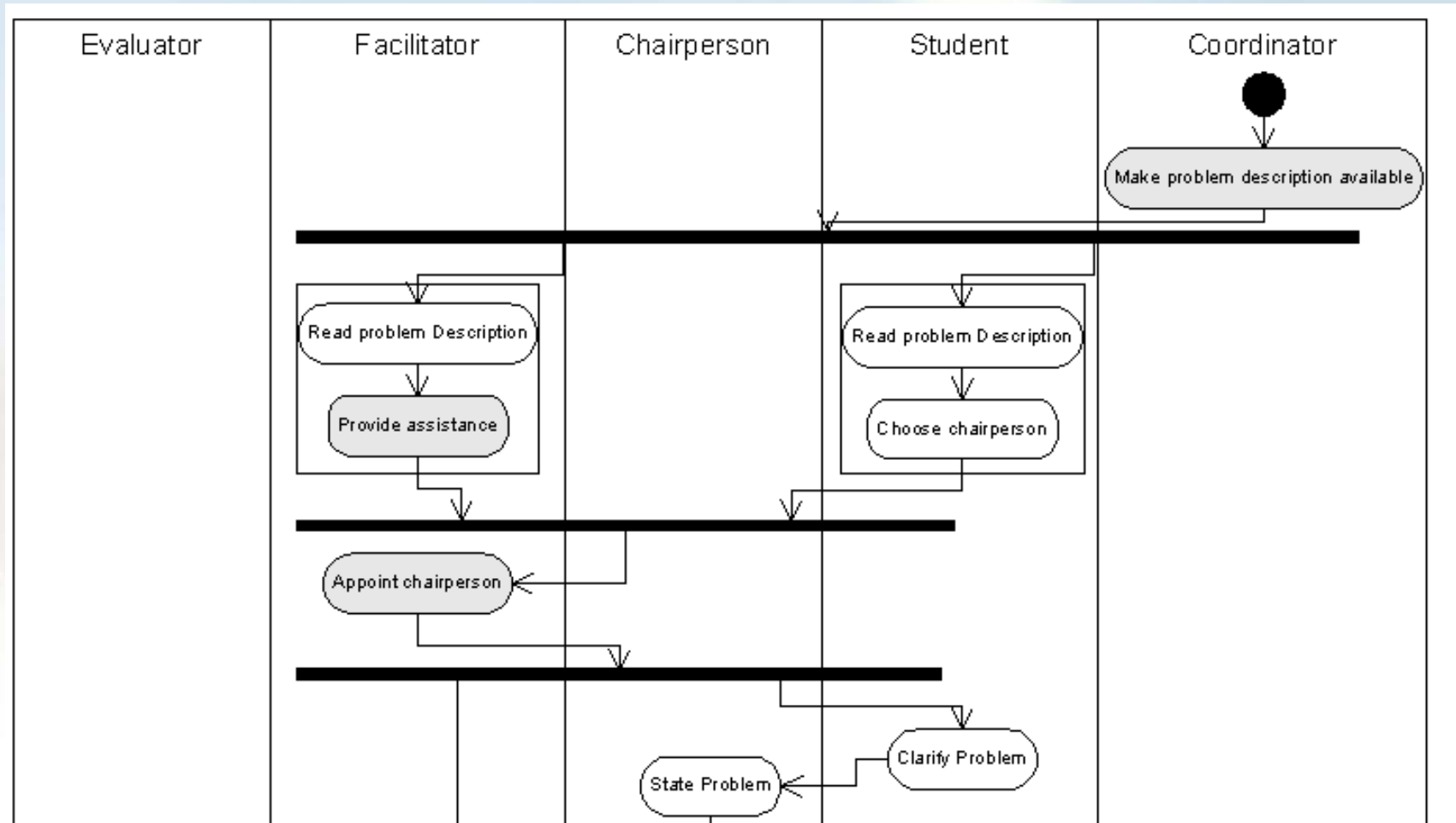
Roles

Activities

The learning design process (2)

- Once examples of the meta-model concepts have been identified, a slightly more formal representation can be created (eg a table listing the sequence of activities, split by role)
- OUNL found UML activity diagrams to be helpful
 - Used in the IMS LD Best Practice and Implementation Guide, but use is not mandated

UML Activity Diagram



The learning design process (3)

- What's next?
 - Say it with XML
- IMS LD has, in common with all IMS specs, a so-called XML binding
- If you represent your UoL in the data format indicated by the binding, a conforming application will be able to do the right thing

The learning design process (4)

- In theory, this is all in the underworld of IT plumbing, from which we are shielded by applications

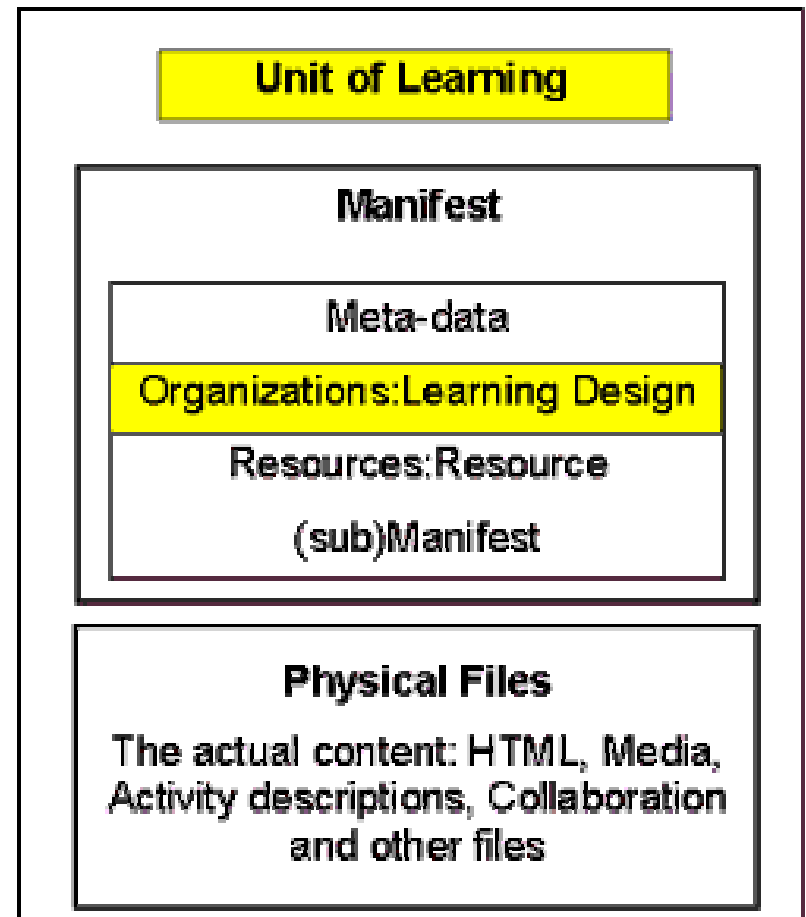
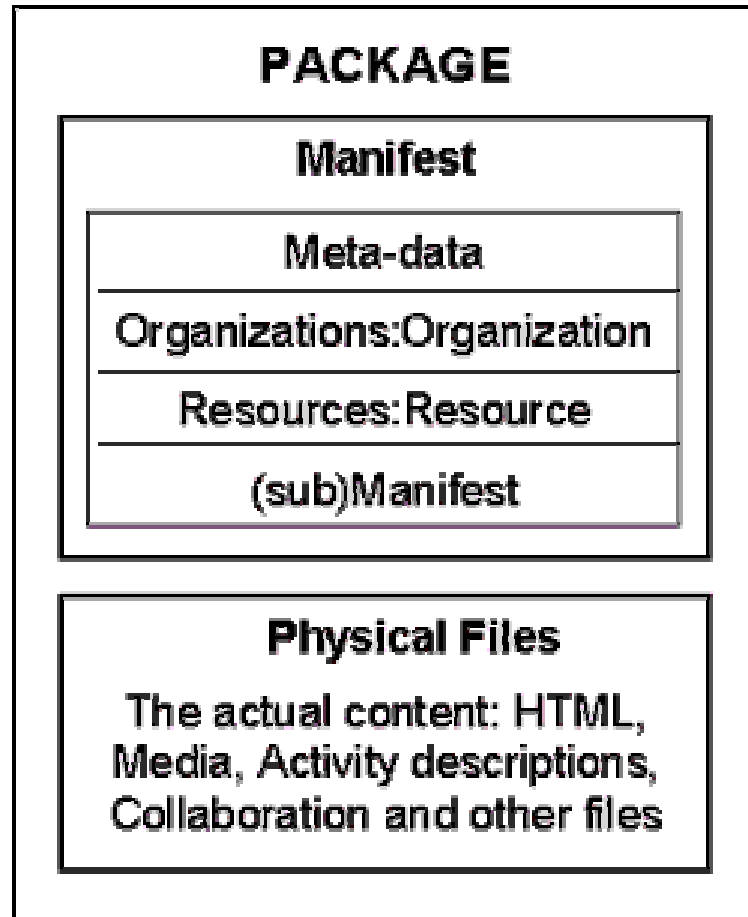
```
<roles>
  <learner identifier="Learner">
    <title>Learner</title>
    <information>
      <title>The Learner role</title>
      <item identifierref="R-information-for-learner"/>
    </information>
  </learner>
</roles>
```

- In practice, today, we are not yet there in terms of tool support and sometimes have to deal with XML

What's the learning design process produce?

- An IMS Content Package
 - Used for exchange of content
- IMS Learning Design is integrated with an IMS Content Package as another kind of organization within the `<organizations>` element.
- An IMS content package is called a 'Unit of learning' if and only if it includes a valid IMS learning-design element in the organizations part of the package's manifest.

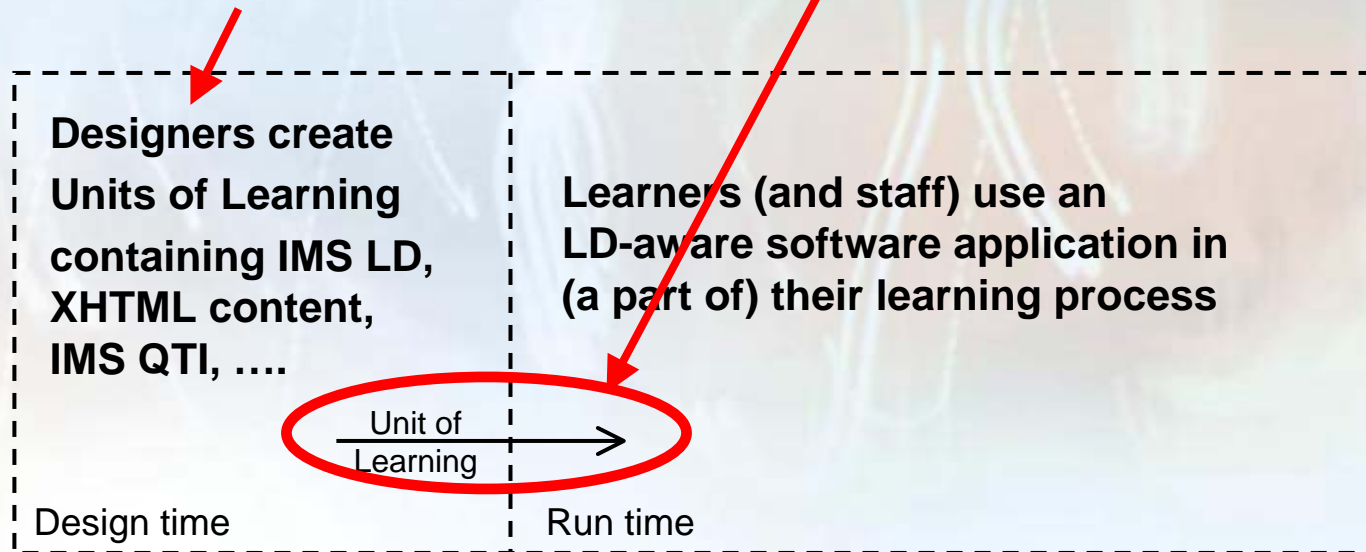
LD and CP



The wider context

IMS LD acts an integrative, orchestrating layer, and typically involves more than just IMS LD (eg IMS CP+MD+LD+QTI+XHTML)

A content package



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Zooming in on IMS LD: The Levels

- Level A: Core concepts:
 - Roles, activities, environments, method
- Level B: Adds
 - Properties and Conditions
- Level C: Adds
 - Notifications
- The levels help when teaching about IMS LD & help tool developers in delivering incrementally, but should not get in the way;

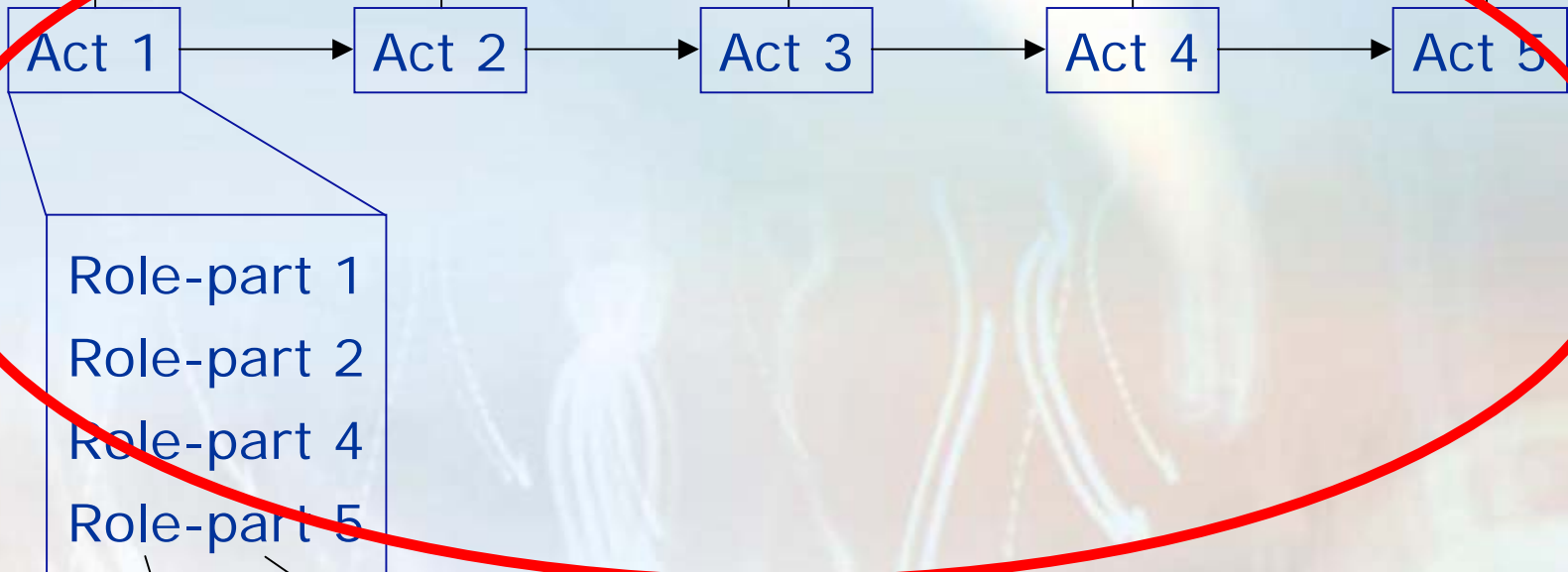
Level A core concepts

- Components
 - Roles
 - Eg Learner, Tutor, Mentor, Facilitator,
 - Learning/Support activities
 - What has to be performed
 - Activity structure
 - Sometimes activities need to be carried out in a *specified order* or the learner may *choose* what to do.
 - Environment
 - Materials might be needed to perform an activity
 - The learner might need to communicate with others
- Method
 - Play, Act, Role-Part

Method

... then orchestrate their interplay

play



Set up these constructs



Components

To help understanding ...

- Although we are discussing modelling, here's a sneak preview of a running UoL to help your understanding
- A course on Jazz described using IMS LD
 - the roles, their activities (structured into sequences or selections), the associated environments etc
 - The play and acts
- How might the content package look in a player?

Learning to listen to jazz - Microsoft Internet Explorer provided by Open Universiteit Nederland

Bestand Bewerken Beeld Favorieten Extra Help

Vorige Zoeken Favorieten Media

Adres http://educontent.ou.nl/webplayer/WPController

Ga naar Koppelingen

To Do Tools & Resources Find

historical route

Learning Activities, structured into sequences and selections

before you start orientation

historical route

New Orleans style

blues

rags

songs

New Orleans

swing

reflection in the meantime

bebop

free jazz

No Title

The environment associated with the selected activity

complete environment

complete environment

start test

sources

portfolio


glossary

An activity description for the selected activity

- *melody* : the sequence from a high to a low tetrachord gives the melody a falling line;
- *rhythm* : virtually absent as the singer allows himself to be led by his emotional response to the lyrics.

Power

Power by Mattie Wigley and Congregation



form : ques

Edubox

Internet

16:33

Plays & Acts

- IMS LD has various mechanisms to help with the ordering (or sequencing) of content
- In the method element of the learning-design element of a Unit of Learning, the play element is used to order a series of acts
- Acts are used to create synchronisation points for learners involved in various roles

Roles, Activities and Role Parts

- Each act (in a sequence of acts) specifies which role-parts are active (concurrently)
- A role-part:
 - links a role to an activity or an activity-structure
- An activity has an activity-description which refers to a resource (eg an XHTML file) contained in the resources section of the content package

Activity Structures: Sequences vs selections

- Do these activities in order
 - SEQUENCE
- Chose one of these alternatives
 - SELECTION number-to-select=1
- Do all (eg 4) of these activities but in any order
 - SELECTION

Activity Structures: Sequences vs selections

Activity Structure: Sequence

Learning Activity 1

Learning Activity 2

Learning Activity 3

Learning Activity 4

Learning Activity 5

Learning Activity 6

Learning Activity 7

Activity Structure: Selection

Learning Activity 1

Learning Activity 2

Activity Structure: selection
number-to-select = 1

Learning Activity 3

Learning Activity 4

Learning Activity 5

Activity Structure: Sequence

Learning Activity 1

Learning Activity 2

Activity Structure: selection
number-to-select = 2

Learning Activity 3

Learning Activity 4

Learning Activity 5

The environment

- Resources needed when performing an activity support & learning)
 - Learning Objects
 - Web pages
 - MS-Word document
 - Pictures
 - Videos
 - etc
 - (Learning) Services
 - send-mail, conference, and index search
- Can also be linked to activity-structure
- Can be nested

Completion

- Need to indicate under which conditions the flow “moves on”
- When/How does a Unit of Learning, a play, an act, an activity, finish?
 - Can be a time-limit, or ...

```
<complete-unit-of-learning>  
  <when-play-completed ref="P-1"/>  
</complete-unit-of-learning>
```

```
<complete-act>  
  <when-role-part-completed  
    ref="RP-Tutor-2"/>  
</complete-act>
```

```
<complete-play>  
  <when-last-act-completed/>  
</complete-play>
```

```
<complete-activity>  
  <user-choice/>  
</complete-activity>
```


One last point before levels B and C

- Can also add an `on-completion` element to give some feedback
 - Reference to a resource (eg XHTML file) in resources section
 - Could in turn reference sound, video, ...

Levels – where are we?

- Level A
 - Components (roles, activities, environments, ...)
 - Method (Play, acts, role-parts)
 - Completion
- You can do quite a lot with these elements, but certainly not everything you'd like to do
- However, adding just a few more elements opens many new doors

Open new doors by ...

- Allowing the learning flow to be influenced not just by `user-choice` or `time-limit` but by other factors
- Allowing more sophisticated approaches to sequencing than provided by `selection` and `sequence`

Level B – properties (1)

- Properties
 - Rather like variables in programming languages
- Completion of activities, acts, etc can depend on properties

```
<complete-activity>
```

```
  <when-property-value-is-set>
```

```
    <property-ref ref="Status-Flag"/>
```

```
    <property-value>true</property-value>
```

```
  </when-property-value-is-set>
```

```
</complete-activity>
```

Level B – properties (2)

- Completion of activities, acts, etc can influence properties

<on-completion>

<change-property-value>

<property-ref ref="Status-Flag"/>

<property-value>>false</property-value>

</ change-property-value >

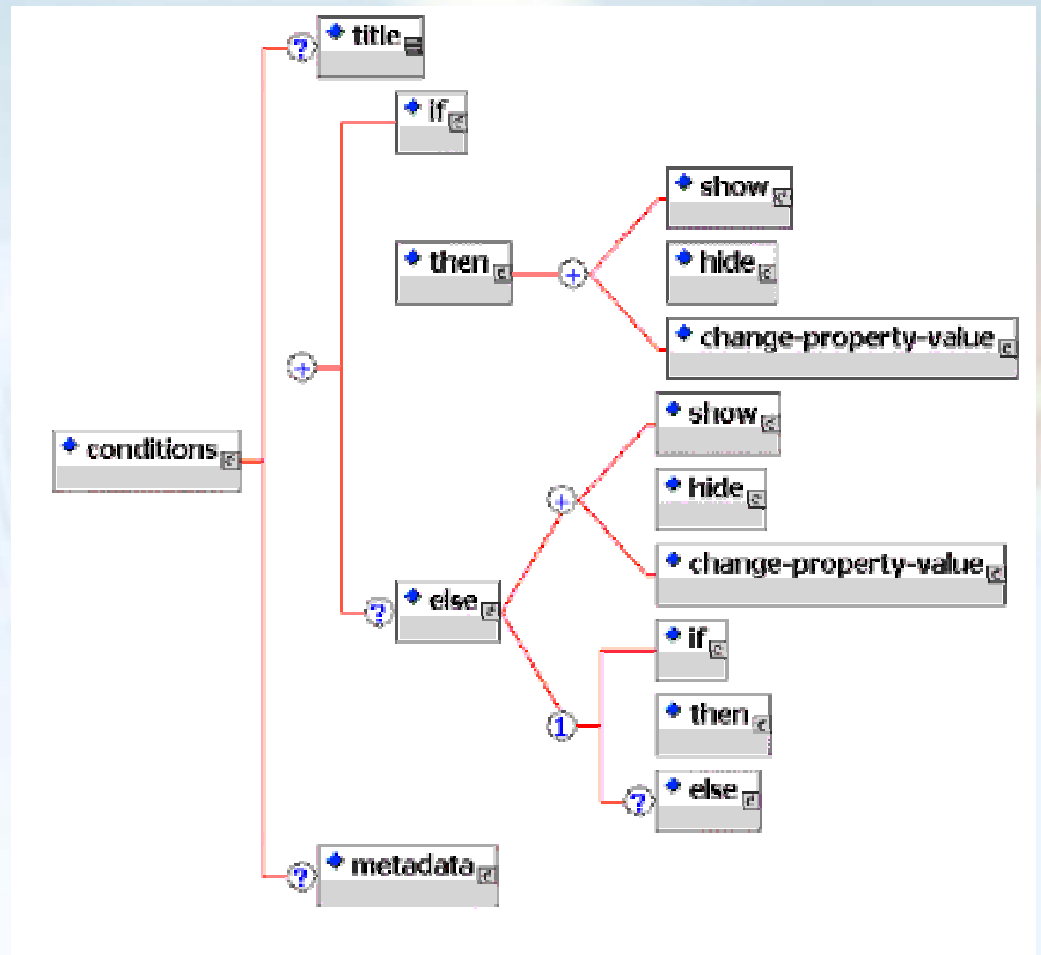
</ on-completion >

Level B – properties (3)

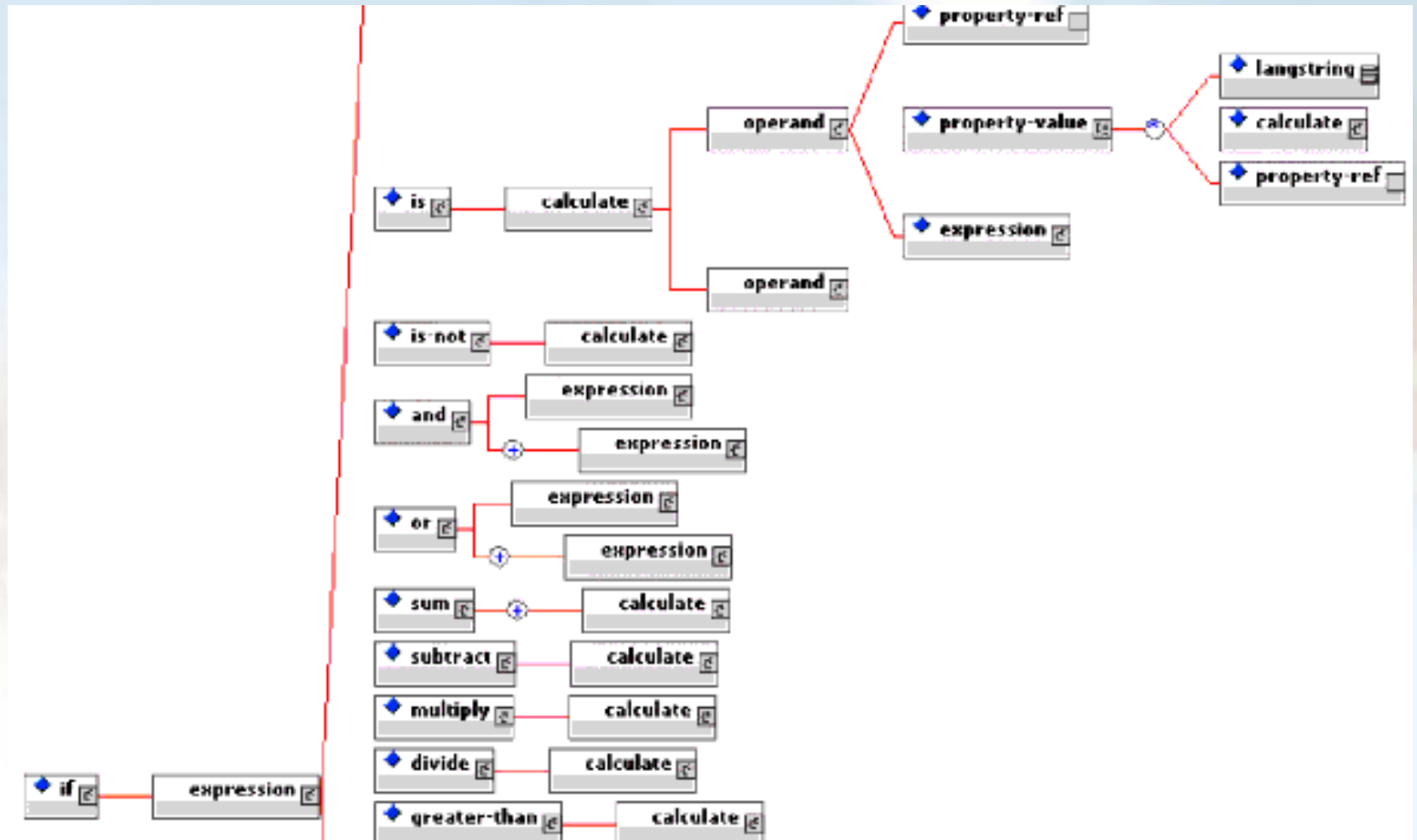
- There are different types of property
 - Local properties
 - Global properties
 - Personal properties
 - Role properties
- Not going to go into on this point in detail today

Level B – conditions (1)

- If a certain situation holds, then show or hide something or change a property
- The latter may in turn trigger another condition to fire and show or hide or change etc



Level B – condition expression language



Level B – show and hide

- Various elements have an `isVisible` attribute which can be modified using `show` and `hide`
- Can also be applied to the `class` attribute as in XHTML
 - Will illustrate this later

Level B also adds:

- The monitor service
 - “a facility for users to look at their own properties or that of others in a structured way”
- Global elements
 - Needed when properties are viewed/set in resources such as learning objects
 - When used, need to indicate that a resource (in the resources section of a content package) is of type `imsldcontent`
 - Again, will illustrate this later

Level C

- Notifications inform a role that something has happened
 - Via email
 - By setting a new activity
- Can trigger using on-completion
- Can trigger using then

Pause for thought

- Quite a lot of theory this morning, many concepts introduced;
- This afternoon's session will take us through a example which is compact enough to be handled quickly, yet broad in its coverage of IMS LD concepts

A word on re-use

- Re-use of complete UoLs (you and I both run the same UoL in our different VLEs and have a similar learning experience)
- Re-use of part of a UoL
 - Separation of learning objects and services from the educational method used in the unit of learning.
 - Individual learning designs can be applied in different areas
 - PBL in psychology, computer science, sociology, ...
 - Learning objects can be used in different learning designs
 - A map of North Korea: use in programmed instruction, PBL, Role-playing exercise

Last slide before lunch (food for thought)

- What do you get with IMS LD?
- Exchange of (multi-role, multi-learner) learning processes:



- Re-use of learning flow and/or learning content;
- A language for describing learning processes
- Comparison of approaches to learning;
 - “Gold standard for Problem Based Learning is as follows
...”

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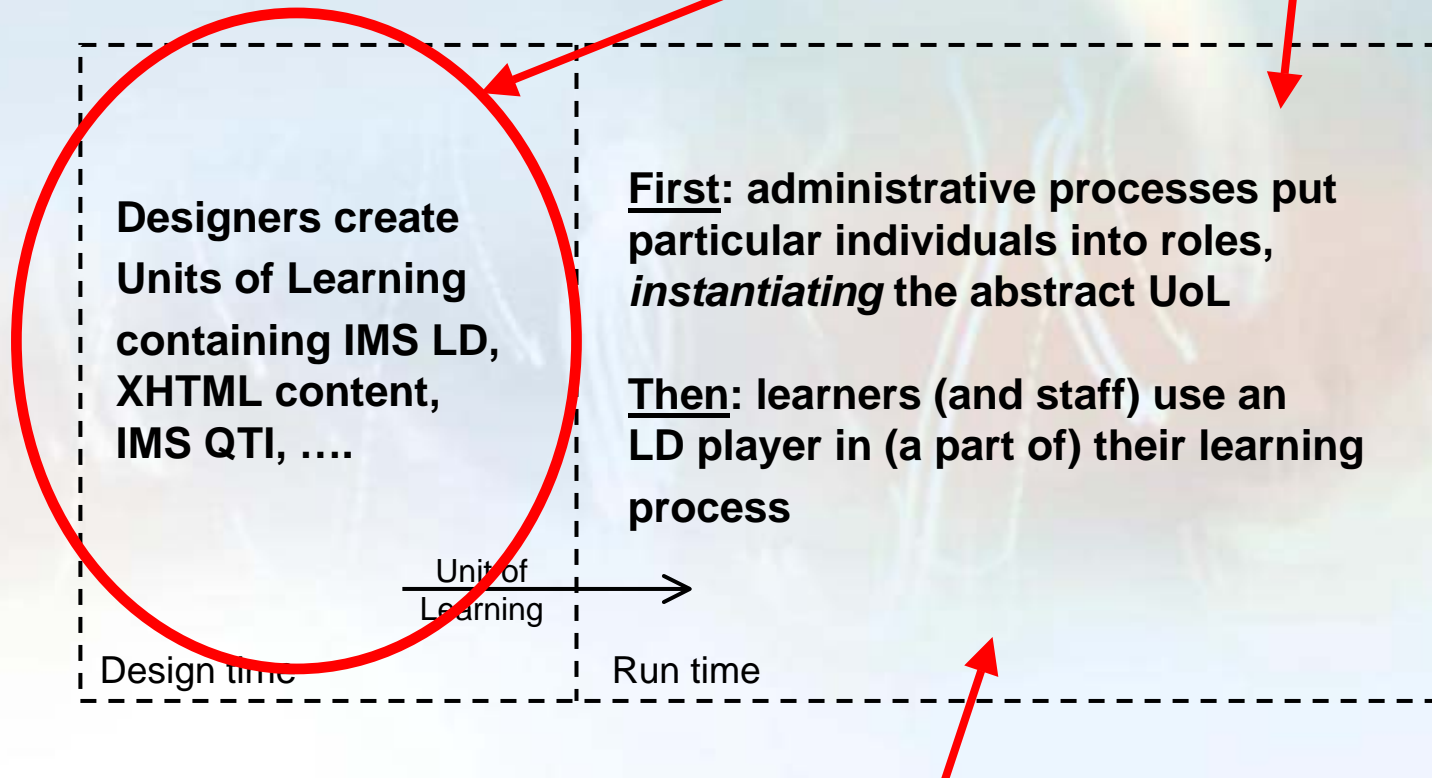
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What do you need to use IMS LD?

1. A way of creating Units of Learning
2. A way of coupling an abstract Unit of Learning to specific learners (instantiating it in a “run”)
 - What we saw this morning was modelling an abstraction of a learning process
3. A way of playing the run so that learners/staff can experience the Unit of Learning

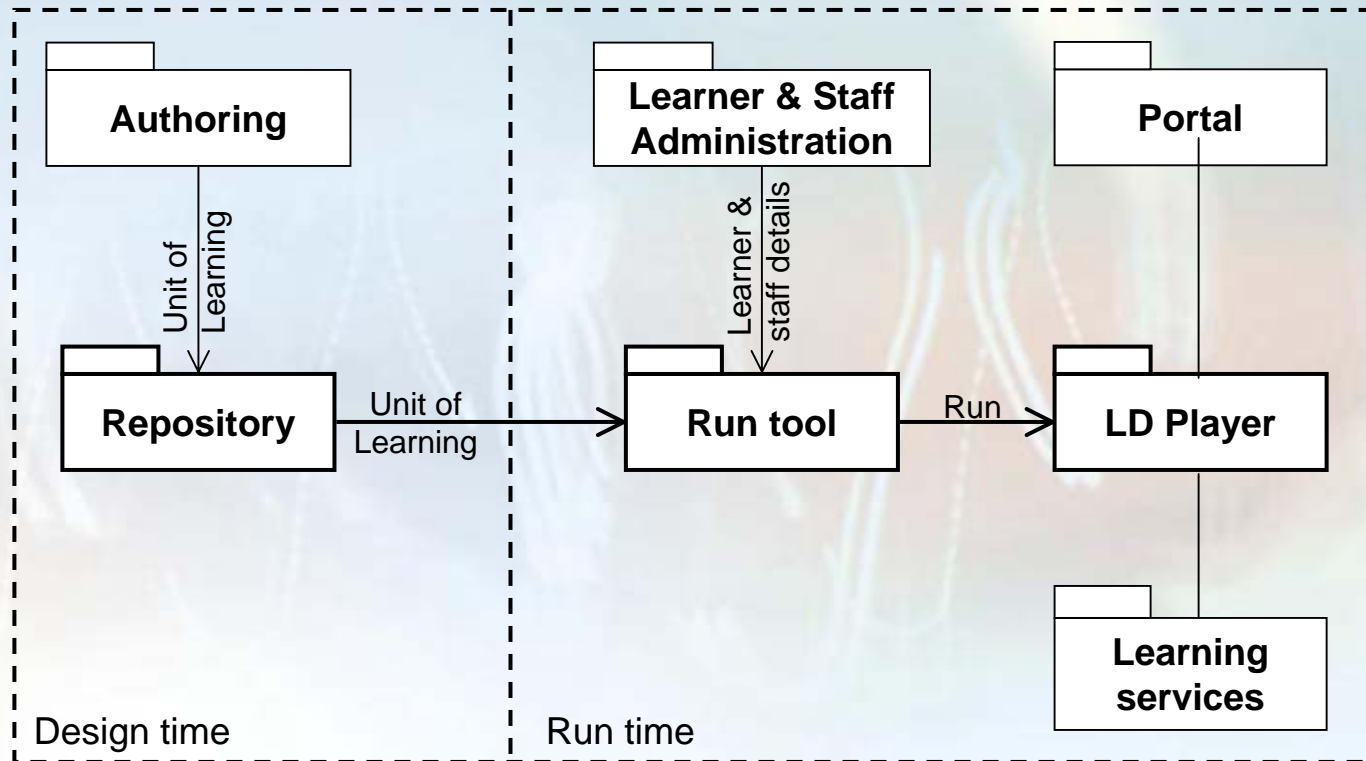
Architectural context (1)

IMS LD specifies this and has implications here

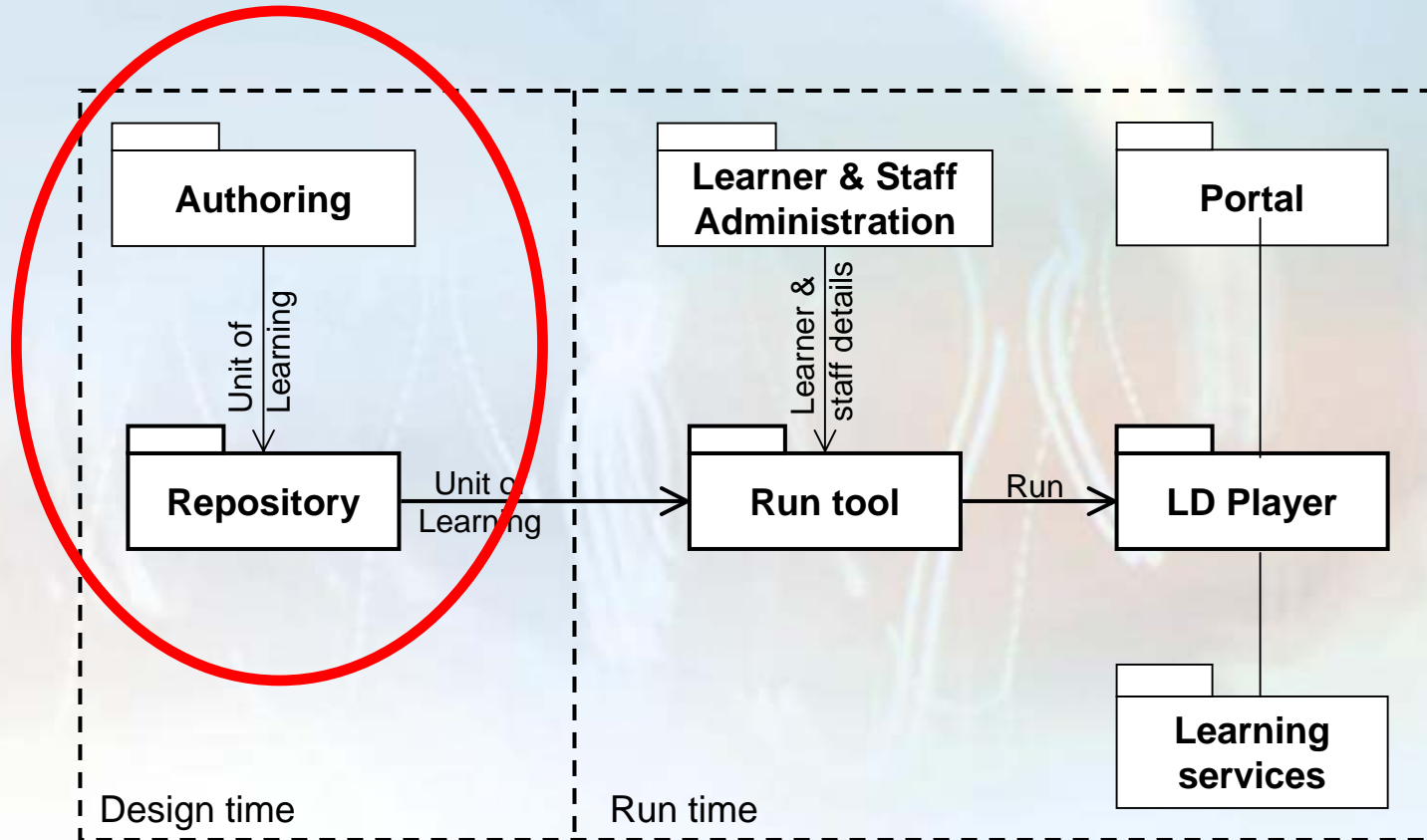


Various aspects to be arranged for here which are not part of the spec

Architectural context (2)



Architectural context (3)



```

<?xml version="1.0" encoding="UTF-8"?>
<imscp:manifest xmlns:imscp="http://www.imsglobal.org/xsd/imscp_v1p1" xmlns="http://www.imsglobal.org/xsd/imsld_v1p0"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance" xmlns:emlmd="http://eml.ou.nl/eml11/metadata"
xsi:schemaLocation="http://www.imsglobal.org/xsd/imscp_v1p1 imscp_v1p1.xsd http://www.imsglobal.org/xsd/imsld_v1p0
IMS_LD_Level_B.xsd http://eml.ou.nl/eml11/metadata metadata.xsd" identifier="what-Is-Greatness-The-Hard-way-r01">
  <imscp:organizations>
    <learning-design identifier="LD-what-Is-Greatness-The-Hard-way-r01" uri="WIGHTHwr01" level="B">
      <title>what is Greatness</title>
      <learning-objectives>
        <title>Learning-objectives</title>
        <item identifierref="R-learning-objectives"/>
      </learning-objectives>
      <prerequisites>
        <title>Prerequisites</title>
        <item identifierref="R-prerequisites"/>
      </prerequisites>
      <components>
        <roles>
          <learner identifier="Learner">
            <title>Learner</title>
            <information>
              <title>The Learner role</title>
              <item identifierref="R-information-for-learner"/>
            </information>
          </learner>
          <staff identifier="Tutor">
            <title>Tutor</title>
            <information>
              <title>The Tutor role</title>
              <item identifierref="R-information-for-tutor"/>
            </information>
          </staff>
        </roles>
        <properties>
          <globpers-property identifier="GP-username">
            <existing href="http://eml.ou.nl/dossier/name"/>
          </globpers-property>
          <globpers-property
identifier="GP-initial-thoughts-GUID-37E65BD4-077A-CC19-6A65-3F687FC9F7B1">
            <global-definition
uri="GP-initial-thoughts-GUID-37E65BD4-077A-CC19-6A65-3F687FC9F7B1">
              <title>what do I think is greatness</title>
              <datatype datatype="text"/>
            </global-definition>
          </globpers-property>
          <globpers-property
identifier="GP-response-to-initial-thoughts-GUID-37E65BD4-077A-CC19-6A65-3F687FC9F7B1">
            <global-definition
uri="GP-response-to-initial-thoughts-GUID-37E65BD4-077A-CC19-6A65-3F687FC9F7B1">
              <title>Responses to the initial thoughts</title>
              <datatype datatype="text"/>
            </global-definition>
          </globpers-property>
        </properties>
      </components>
    </learning-design>
  </imscp:organizations>
</imscp:manifest>

```




1 **Activity** Activity [hbm2-a-comp-1-oefen-1 competence 1: practice 1.0.2 Show Not-reusable]

Metadata Metadata

Title Title Competence 1: practice **Title** **Metadata**

Activity-description Activity-description

Introduction Introduction

<information on activity>

What What

Special Special [elaboration staff Block-in-flow]

Teacher: provide extra information

For [Self] set value of property [hbm2-p-comp-1-oefen-1-toelichting]

View provided information: for [Self] view value of

property [hbm2-p-comp-1-oefen-1-toelichting]

--- End special ---

Special Special [extra explanation ct-comp-1-oefen-1-toelichting Block-in-flow]

Teacher provided extra information

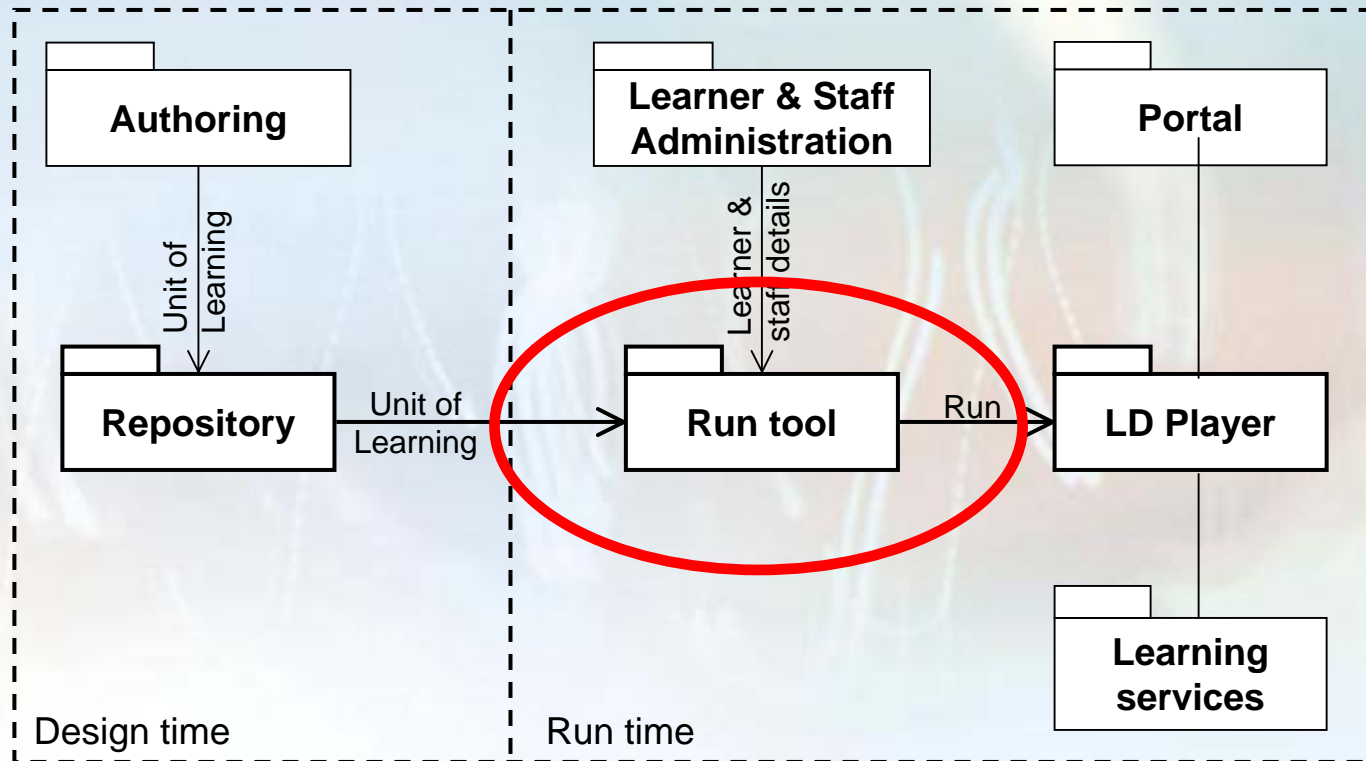
New authoring tools needed

- Need to move up from the tag level
- There is progress – see later

But: authoring is not just a tool question

- Who determines the pedagogical model?
- Who supplies the content?
- Can anything be re-used and if so how?
- Who makes the XML?
- Which meta-data is used?
- How is it going to be tested?

Architectural context (4)



Runs, Learners, Roles and Groups (1)












- a course is run once only (then discontinued), with a single set of learners.
- a course is run for several sets of learners
 - Eg Class size restrictions
- a course is run for (possibly several sets of) learners and the learners are divided into groups
 - Eg Group-based learning
- a course is run only when, but as soon as, there are enough learners enrolled on it.

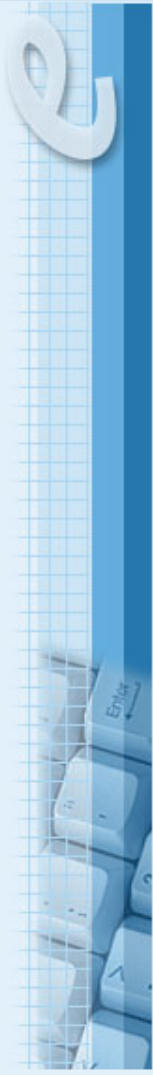
Runs, Learners, Roles and Groups (2)

- Role Constraints specified at design time
 - min-persons
 - Specifies the minimum number of persons bound to the role before starting the run.
 - max-persons
 - Specifies the maximum
- Example: cohort of 200 learners, minimum of ten and maximum of twenty individuals in the role of learner.
 - ten runs

JMA Welcome to EduTool.

List of Assigned Policies for JMA

-  Expose Properties
-  User Management
-  User Authorization
-  Style Package Management
-  Publication Management
-  Enroll Learners
-  Update Publication
-  Run Management
-  Role Management
-  View Log
-  Play EML



Expose Properties	:Expose personal property to the user manager.
User Management	:Act as user manager to add, modify and delete users.
User Authorization	:Assign and revoke policies for staff members.
Style Package Management	:Add and remove style packages.
Publication Management	:Create, modify and delete metadata of publications.
Enroll Learners	:Enroll learners for publications.
Update Publication	:Update content of publications.
Run Management	:Create, manage and delete runs.
Role Management	:Planning of roles within a run.
View Log	:View the log data containing all EduTool transactions.
Play EML	:To view unit of learning.

Role Details

Publication Name : Cetus model
Run Name : cetis model 1

Create New Instance

- Roles
 - Staff
 - staf
 - docent-begeleider
 - Learner

Unassigned Users

Assigned Users

>

>>

<<

<

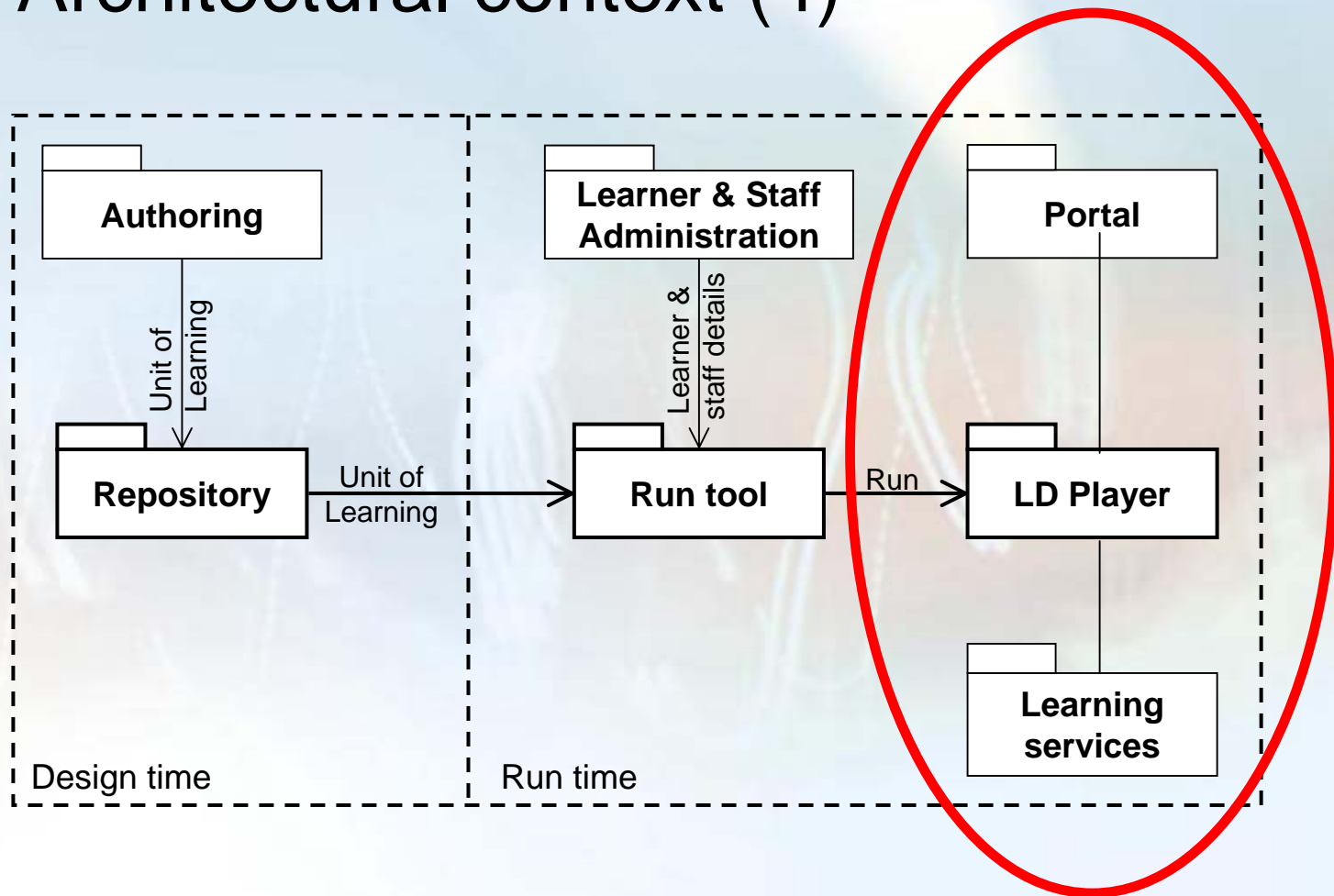
docent1(ou-docent1)
docent2(ou-docent2)
Manderveld, Jocelyn(JMA)

OK

Cancel

Undo

Architectural context (4)



Overview

- **10:15** Welcome, objectives for the day, introductions
- **10:30** Today's e-learning landscape
- **10:45** Modelling Units of Learning: Part I
- **11:30** Tea/Coffee Break
- **11:45** Modelling Units of Learning: Part II
- **13:00** Lunch
- **14:00** Putting IMS LD into practice
- **14:30** Case study: Part I
- **16:00** Tea/Coffee Break
- **16:30** Case study: Part II
- **17:15** Current Developments
- **17:45** Summary and reflection on the day
- **18:00** Close

Case Study Part 1

- In order to reinforce the concepts introduced, we'll take an example, see how it looks in a player, then see how it works
 - With thanks to James Dalziel (Macquarie ELearning Centre of Excellence) and the Alfabet project

What is Greatness

- Try to create a UML activity diagram for the following:
 - *Students individually consider “what is greatness?”;*
 - *They enter a few sentences of initial thoughts;*
 - *This process is monitored and ended by the tutor;*
 - *All learners then see all responses (anonymous);*
 - *All learners then enter personal reflections on all responses (not made public);*
 - *The tutor receives all responses and personal reflections once they have been entered;*
 - *The tutor gives feedback on the responses and reflections and finishes the learning activity on a per learner basis.*

What is Greatness – suggested approach

- See handout
- [Click to view](#)

How might a run for this UoL look?

- Surf to educontent.ou.nl
- Click on the Edubox Content Test hyperlink
- Log in with the usernames and passwords ([click to view](#)) and follow the on-line instructions
- You are all in the role of learner
- I will act as the tutor
 - I'll stop the session at various points to show you 'what the tutor saw'

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- **17:15** Current Developments
- **17:45** Summary and reflection on the day
- **18:00** Close

So what does the UoL look like?

- We will step through parts of the UoL and highlight some of the most important constructs
 - UoL is an IMS Content Package
 - zip file with imsmanifest.xml (containing a manifest containing an organisation containing a learning design)
 - Several other files used as resources

Roles

```
<roles>  
  <learner identifier="Learner">  
    <title>Learner</title>  
    <information>  
      <title>The Learner role</title>  
      <item identifierref="R-information-for-learner"/>  
    </information>  
  </learner>  
  <staff identifier="Tutor">  
    <title>Tutor</title>  
    <information>  
      <title>The Tutor role</title>  
      <item identifierref="R-information-for-tutor"/>  
    </information>  
  </staff>  
</roles>
```

Play, Act, Role-parts

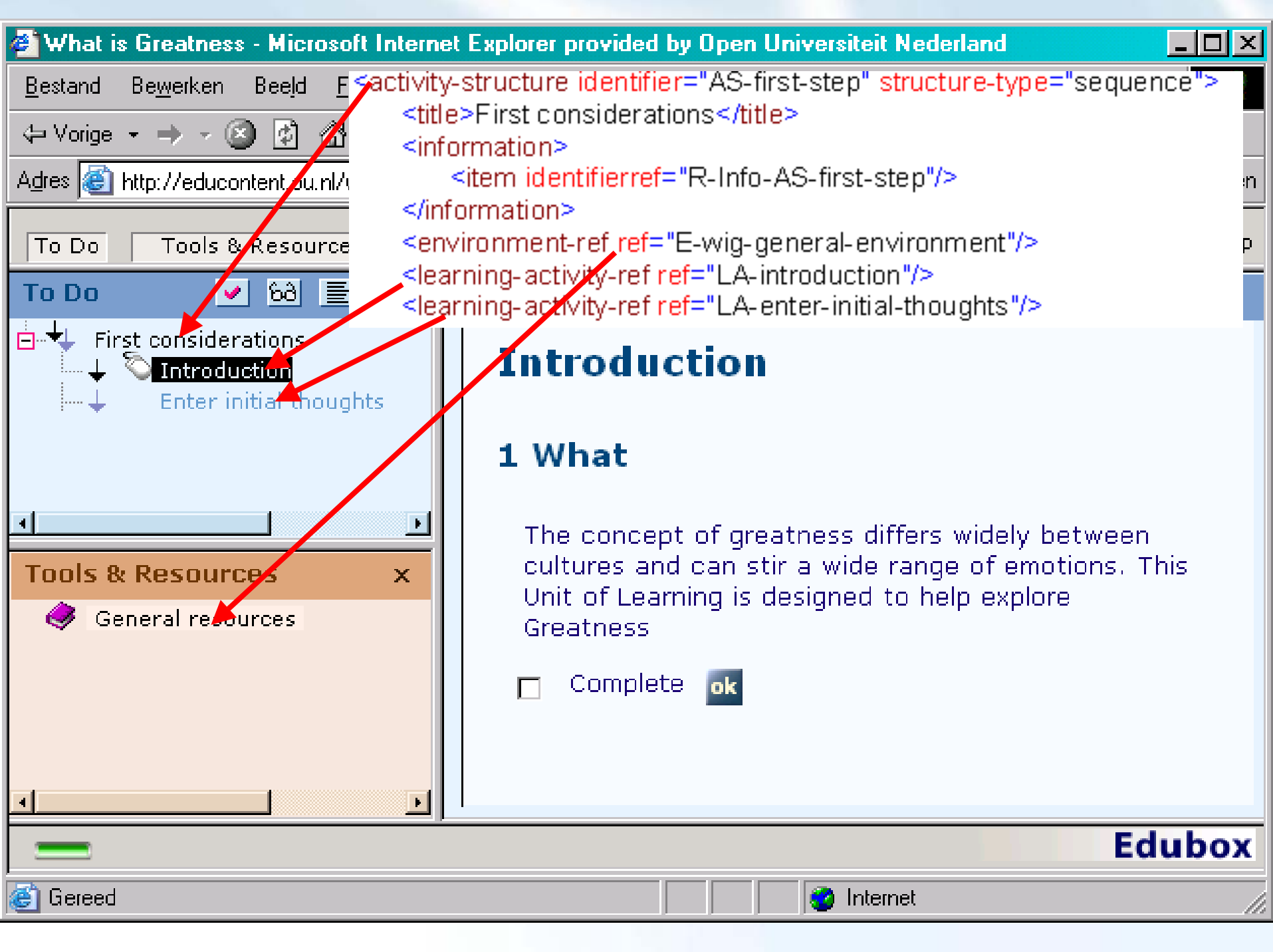
```
<play identifier="P-1" isvisible="true">
  <title>What is Greatness - default play</title>
  <act identifier="A-1">
    <title>What is Greatness - Default act</title>
    <role-part identifier="RP-Learner-1">
      <title>First step</title>
      <role-ref ref="Learner"/>
      <activity-structure-ref ref="AS-first-step"/>
    </role-part>
    <role-part identifier="RP-Tutor-1">
      <title>Support activities for first step</title>
      <role-ref ref="Tutor"/>
      <support-activity-ref ref="SA-first-step"/>
    </role-part>
    <role-part identifier="RP-Learner-2">
      <title>Second step</title>
      <role-ref ref="Learner"/>
      <activity-structure-ref ref="AS-second-step"/>
    </role-part>
    <role-part identifier="RP-Tutor-2">
      <title>Support activities for second step</title>
      <role-ref ref="Tutor"/>
      <support-activity-ref ref="SA-respond"/>
    </role-part>
    <complete-act>
      <when-role-part-completed ref="RP-Tutor-2"/>
    </complete-act>
  </act>
  <complete-play>
    <when-last-act-completed/>
  </complete-play>
</play>
```

Visible initially

Activity structures

```
<activity-structure identifier="AS-first-step" structure-type="sequence">
  <title>First considerations</title>
  <information>
    <item identifierref="R-Info-AS-first-step"/>
  </information>
  <environment-ref ref="E-wig-general-environment"/>
  <learning-activity-ref ref="LA-introduction"/>
  <learning-activity-ref ref="LA-enter-initial-thoughts"/>
</activity-structure>

<activity-structure identifier="AS-second-step" structure-type="sequence">
  <title>What do others think?</title>
  <information>
    <item identifierref="R-Info-AS-second-step"/>
  </information>
  <environment-ref ref="E-wig-general-environment"/>
  <environment-ref ref="E-overview-thoughts"/>
  <environment-ref ref="E-response-by-tutor"/>
  <learning-activity-ref ref="LA-respond-to-others"/>
</activity-structure>
```

```
<activity-structure identifier="AS-first-step" structure-type="sequence">
  <title>First considerations</title>
  <information>
    <item identifierref="R-Info-AS-first-step"/>
  </information>
  <environment-ref ref="E-wig-general-environment"/>
  <learning-activity-ref ref="LA-introduction"/>
  <learning-activity-ref ref="LA-enter-initial-thoughts"/>
</activity-structure>
```

Introduction

1 What

The concept of greatness differs widely between cultures and can stir a wide range of emotions. This Unit of Learning is designed to help explore Greatness

☐ Complete

Edubox

Learning Activities (1)

```
<learning-activity isvisible="true" identifier="LA-introduction">  
  <title>Introduction</title>  
  <activity-description>  
    <item identifier="I-introduction-a" identifierref="R-dummy"/>  
  </activity-description>  
  <complete-activity>  
    <user-choice/>  
  </complete-activity>  
</learning-activity>
```

```
<learning-activity invisible="true" identifier="LA-introduction">
  <title>Introduction</title>
  <activity-description>
    <item identifier="I-introduction-a" identifierref="R-dummy"/>
  </activity-description>
  <complete-activity>
    <user-choice/>
  </complete-activity>
</learning-activity>
```

Navigation menu:

- Ga naar
- Koppelingen
- Course info
- Help
- Synchronize
- About

Introduction

1 What

The concept of greatness differs widely between cultures and can stir a wide range of emotions. This Unit of Learning is designed to help explore Greatness

☐ Complete **ok**

Introduction

Enter initial thoughts

Tools & Resources

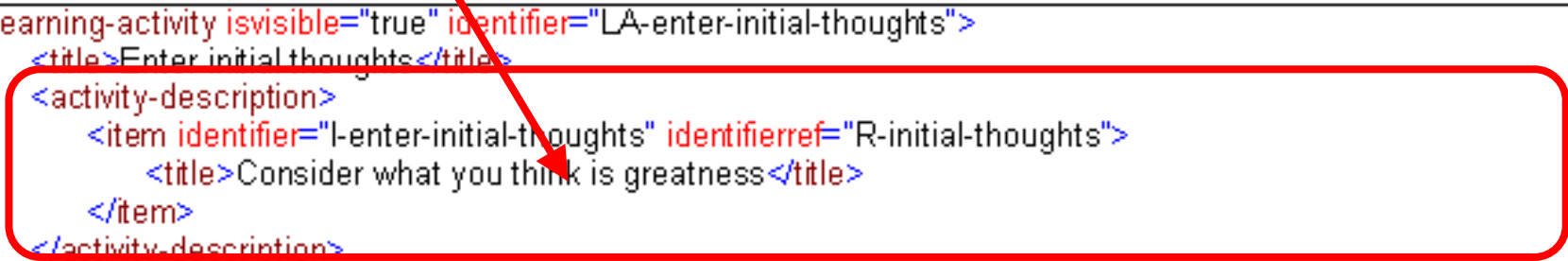


General resources

Edubox

Learning Activities (2)

This activity involves the learner entering thoughts ...



```
<learning-activity isvisible="true" identifier="LA-enter-initial-thoughts">
  <title>Enter initial thoughts</title>
  <activity-description>
    <item identifier="I-enter-initial-thoughts" identifierref="R-initial-thoughts">
      <title>Consider what you think is greatness</title>
    </item>
  </activity-description>
  <complete-activity>
    <when-property-value-is-set>
      <property-ref ref="LP-activity-2-completed-GUID-37E65BD4-077A-CC19-6A65-3F687FC9F7B1"/>
      <property-value>true</property-value>
    </when-property-value-is-set>
  </complete-activity>
</learning-activity>
```

```
<activity-description>
```

```
<item identifier="I-enter-initial-thoughts" identifierref="R-initial-thoughts">
```

```
<title>Consider what you think is greatness</title>
```

```
<imscp:resource identifier="R-initial-thoughts" type="imsldcontent" href="initial-thoughts-form.xml">
```

```
<imscp:file href="initial-thoughts-form.xml"/>
```

```
</imscp:resource>
```

To Do

```
<?xml version="1.0" encoding="UTF-8"?>
```

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
```

```
<html xmlns:ld="http://www.imsglobal.org/xsd/imsld_v1p0" xmlns="http://www.w3.org/1999/xhtml">
```

```
<head>
```

```
<title>Enter some initial thoughts regarding what is greatness</title>
```

```
</head>
```

```
<body>
```

```
<div class="C-Activity2-not-complete block-in-flow">
```

```
<p>Please enter your initial thoughts about what you think is greatness.</p>
```

```
<ld:set-property ref="GP-initial-thoughts-GUID-37E65BD4-077A-CC19-6A65-000000000000" value=""/>  
</div>
```

Tools & Resources



General resources

Greatness is when a human excels and stimulates others to

ok

Edubox

Learning Activities (2)

This activity involves the learner entering thoughts ...

```
<learning-activity isvisible="true" identifier="LA-enter-initial-thoughts">
  <title>Enter initial thoughts</title>
  <activity-description>
    <item identifier="I-enter-initial-thoughts" identifierref="R-initial-thoughts">
      <title>Consider what you think is greatness</title>
    </item>
  </activity-description>
  <complete-activity>
    <when-property-value-is-set>
      <property-ref ref="LP-activity-2-completed-GUID-37E65BD4-077A-CC19-6A65-3F687FC9F7B1"/>
      <property-value>true</property-value>
    </when-property-value-is-set>
  </complete-activity>
</learning-activity>
```

This property set by the tutor who is monitoring how the groups is doing ...

Support Activities

```
<support-activity identifier="SA-first-step" isvisible="true">
  <title>Monitor the initial thoughts</title>
  <environment-ref ref="E-wig-general-environment"/>
  <environment-ref ref="E-overview-responses"/>
  <activity-description>
    <item identifier="I-sa-first-step" identifierref="R-set-activity2-complete">
      <title>Set the activity to completed</title>
    </item>
  </activity-description>
  <complete-activity>
    <when-property-value-is-set>
      <property-ref ref="LP-activity-2-completed-GUID-37E65BD4-077A-CC">
        <property-value>true</property-value>
      </property-ref>
    </when-property-value-is-set>
  </complete-activity>
</support-activity>
```


[Services](#)
[Options](#)
[Course info](#)
[Help](#)

Check to complete the activity:

ok

Initial Thoughts

Status of Unit of Learning

Completed

Initial Thoughts - Microsoft In...

activity ha

Initial Thoughts - Microsoft In...

Over

Overview of initial thoughts

Learner	Overview of the initial thoughts
Colin Tattersall	Greatness is when a human excels and stimulates others to

Edubox

 Internet

niversi

Where did the overview come from?

```
<support-activity identifier="SA-first-step" isvisible="true">
  <title>Monitor the initial thoughts</title>
  <environment-ref ref="E-wig-general-environment"/>
  <environment-ref ref="E-overview-responses"/>
  <activity-description>
    <item identifier="I-sa-first-step" identifierref="R-set-activity2-complete">
      <title>Set the activity to completed</title>
    </item>
  </activity-description>
</support-activity>
```

```
<environment identifier="E-overview-responses">
  <title>Overview of thoughts and responses</title>
  <service identifier="S-overview-initial-thoughts-tutor">
    <monitor>
      <role-ref ref="Learner"/>
      <title>Initial Thoughts</title>
      <item identifierref="R-initial-thoughts-overview-tutor"/>
    </monitor>
  </service>
</environment>
```

How did the flow move on?

```
<if>
  <is>
    <property-ref ref="LP-activity-2-completed-GUID-37E65BD4-077A-C0" />
    <property-value>true</property-value>
  </is>
</if>

<then>
  <show>
    <class class="C-Activity2-complete"/>
    <activity-sequence-ref ref="AS-second-step"/>
    <support-activity-ref ref="SA-respond"/>
  </show>
  <hide>
    <class class="C-Activity2-not-complete"/>
  </hide>
</then>

<else>
  <show>
    <class class="C-Activity2-not-complete"/>
  </show>
  <hide>
    <class class="C-Activity2-complete"/>
    <activity-sequence-ref ref="AS-second-step"/>
    <support-activity-ref ref="SA-respond"/>
  </hide>
</else>
```

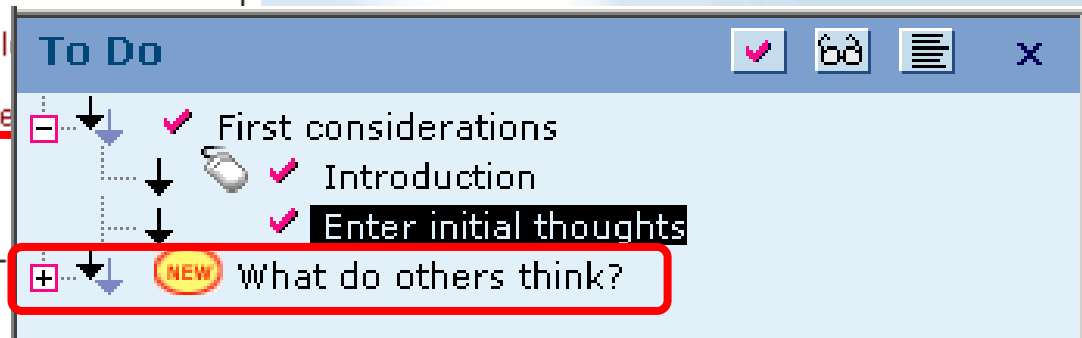
and

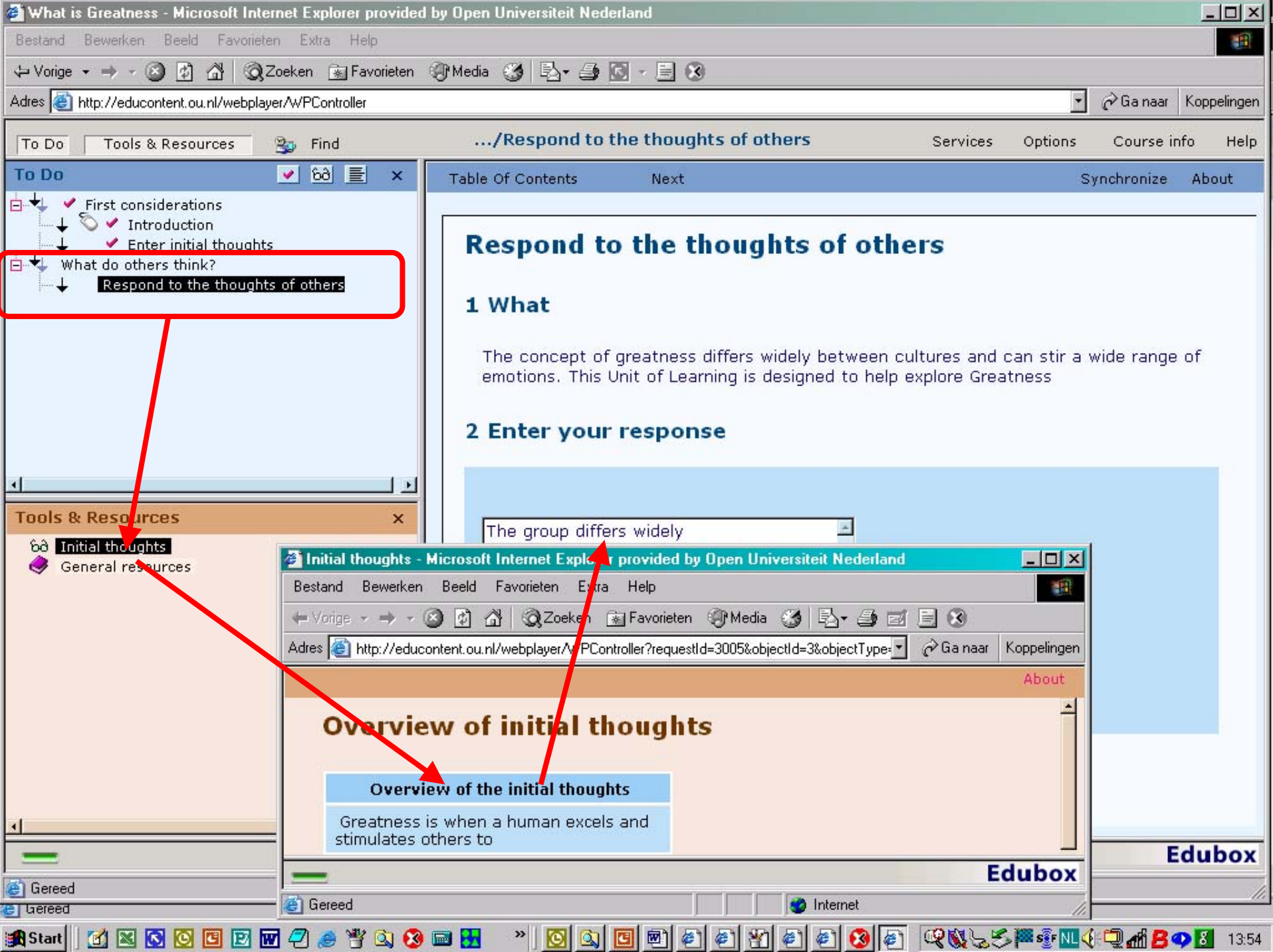
What happened (1)?

```
<?xml version="1.0" encoding="UTF-8"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN" "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns:Id="http://www.imsglobal.org/xsd/imsId_v1p0" xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>Enter some initial thoughts regarding what is greatness</title>
  </head>
  <body>
    <div class="C-Activity2-not-complete" block-in-flow">
      <p>Please enter your initial thoughts about what you think is greatness.</p>
      <Id:set-property ref="GP-initial-thoughts-GUID-37E65BD4-077A-CC19-6A65-3F687FC9F7B1"/>
    </div>
    <div class="C-Activity2-complete" block-in-flow">
      <p>You entered these initial thoughts:</p>
      <table border="0" width="50%" cellpadding="1" cellspacing="0">
        <tr>
          <td>
            <Id:view-property href="GP-initial-thoughts-GUID-37E65BD4-077A-CC19-6A65-3F687FC9F7B1"
property-of="self" view="value"/>
          </td>
        </tr>
      </table>
    </div>
    <div class="C-Activity2-complete in-flow">The activity has been completed by the tutor.</div>
  </body>
</html>
```

What happened (2)?

```
<play identifier="P-1" isvisible="true">
  <title>What is Greatness - default play</title>
  <act identifier="A-1">
    <title>What is Greatness - Default act</title>
    <role-part identifier="RP-Learner-1">
      <title>First step</title>
      <role-ref ref="Learner"/>
      <activity-structure-ref ref="AS-first-
    </role-part>
    <role-part identifier="RP-Tutor-1">
      <title>Support activities for first step</title>
      <role-ref ref="Tutor"/>
      <support-activity-ref ref="SA-first-step"/>
    </role-part>
    <role-part identifier="RP-Learner-2">
      <title>Second step</title>
      <role-ref ref="Learner"/>
      <activity-structure-ref ref="AS-second-step"/>
    </role-part>
    <role-part identifier="RP-Tutor-2">
      <title>Support activities for second step</title>
      <role-ref ref="Tutor"/>
      <support-activity-ref ref="SA-respond"/>
    </role-part>
    <complete-act>
      <when-role-part-completed ref="RP-Tutor-2"/>
    </complete-act>
  </act>
</complete-play>
</play>
```





Tutor able to view
initial thoughts and
response to groups'
for each learner

Then set to c
for each learn

```
<support-activity identifier="SA-respond" isvisible="true">  
  <title>Respond to initial thoughts</title>  
  <role-ref ref="Learner"/>  
  <environment-ref ref="E-wig-general-environment"/>  
  <environment-ref ref="E-overview-responses"/>  
  <activity-description>  
    <item identifierref="R-response-to-initial-thoughts-form-tutor"/>  
  </activity-description>  
</support-activity>
```

The screenshot shows a Microsoft Internet Explorer window titled 'What is Greatness - Microsoft Internet Explorer provided by Open Universiteit Nederland'. The address bar shows 'http://educontent.ou.nl/webplayer/WPController'. The browser has a menu bar (Bestand, Bewerken, Beeld, Favorieten, Extra, Help) and a toolbar with navigation and search icons. Below the browser window, there is a sidebar with a 'Te Doen' section containing a list of tasks: 'Monitor the initial thoughts' and 'Respond to initial thoughts'. The main content area is titled 'Respond to initial thoughts' and contains a form with the label 'Initial thoughts:'. A dropdown menu in the top right corner of the main area is set to 'colin'. At the bottom of the main area, there is a blue box with the text 'You can set the activity to completed for this learner' and an 'ok' button. The bottom of the browser window shows a status bar with 'Gereed' and 'Internet'.

What aspects of IMS LD did we see?

- Multiple roles
- Collaboration
- A learning service
- Properties
- Completion rules
- Conditions
- Showing and Hiding
- Global elements

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New Developments

- European Projects
 - UNFOLD
 - AlfaNet
 - CopperCore
- Other tooling developments
 - RELOAD
 - elive Learning Design Toolkit
 - Eduplone Learning Sequence
- Hot off the press
 - Forthcoming book on Learning Design from Springer
 - Blackboard EduBox announcement



EU 6th Framework Coordination Action (2004/5)

- Universitat Pompeu Fabra, OUNL, Bolton Institute (who manage CETIS) and EUCEN
- Goal
 - to accelerate the adoption, implementation, use and further development of open standards that support multiple as well as single learners and a wide range of pedagogical models
- How? Via Communities of Practice
 - exchange and disseminate examples of good practice
 - agree consistent interpretations and usage of specifications
 - provide a focus for studies of issues raised by the specification, in the context of enhancing learning and better pedagogy



(cont.)

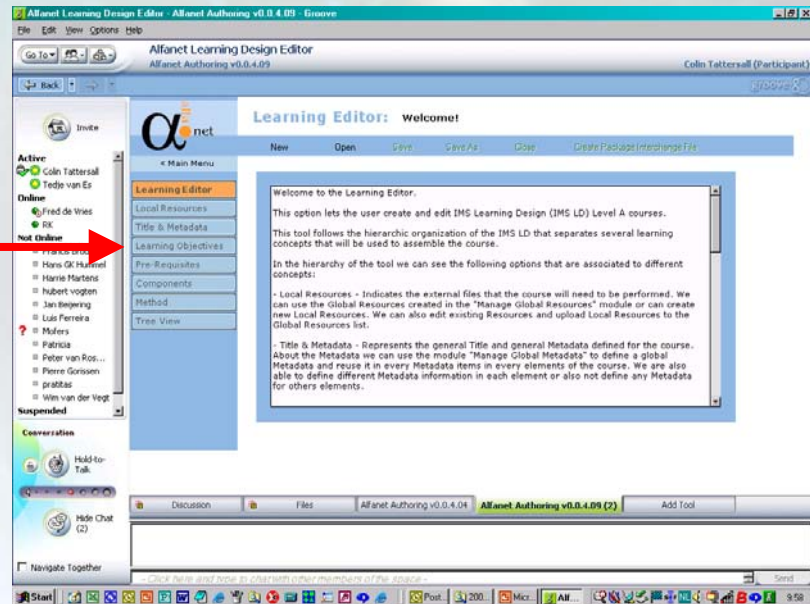
- We would like to get you involved!
- Please see details in the handout



Alfanet (IST-2001-33288)

- Active Learning for Adaptive Internet (5th Framework)
- Using IMS LD (and other IMS specs)
- Producing a demonstrator

- LD Authoring environment based on Groove



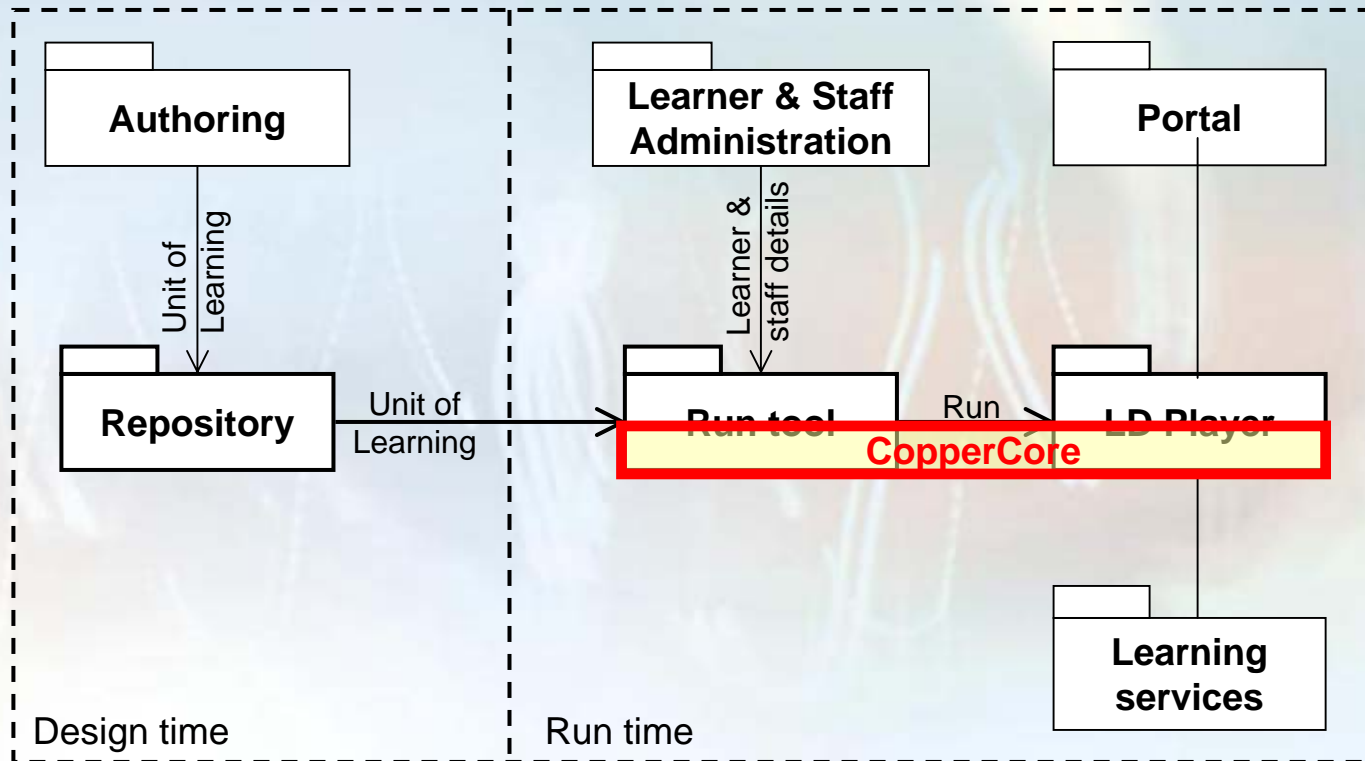
- Run-time system based openACS/dotLRN

- In this system there's an engine known as CopperCore

What is CopperCore?

- Open source IMS Learning Design engine capable of processing units of learning.
- Hides complexity of IMS LD for developers wishing to incorporate IMS LD into their products.
- Does not provide any user interface. Not a stand alone product.
- Uses XML for data exchange with clients
 - XML format resembles IMS LD as closely as possible
- Uses properties as main data storage mechanism

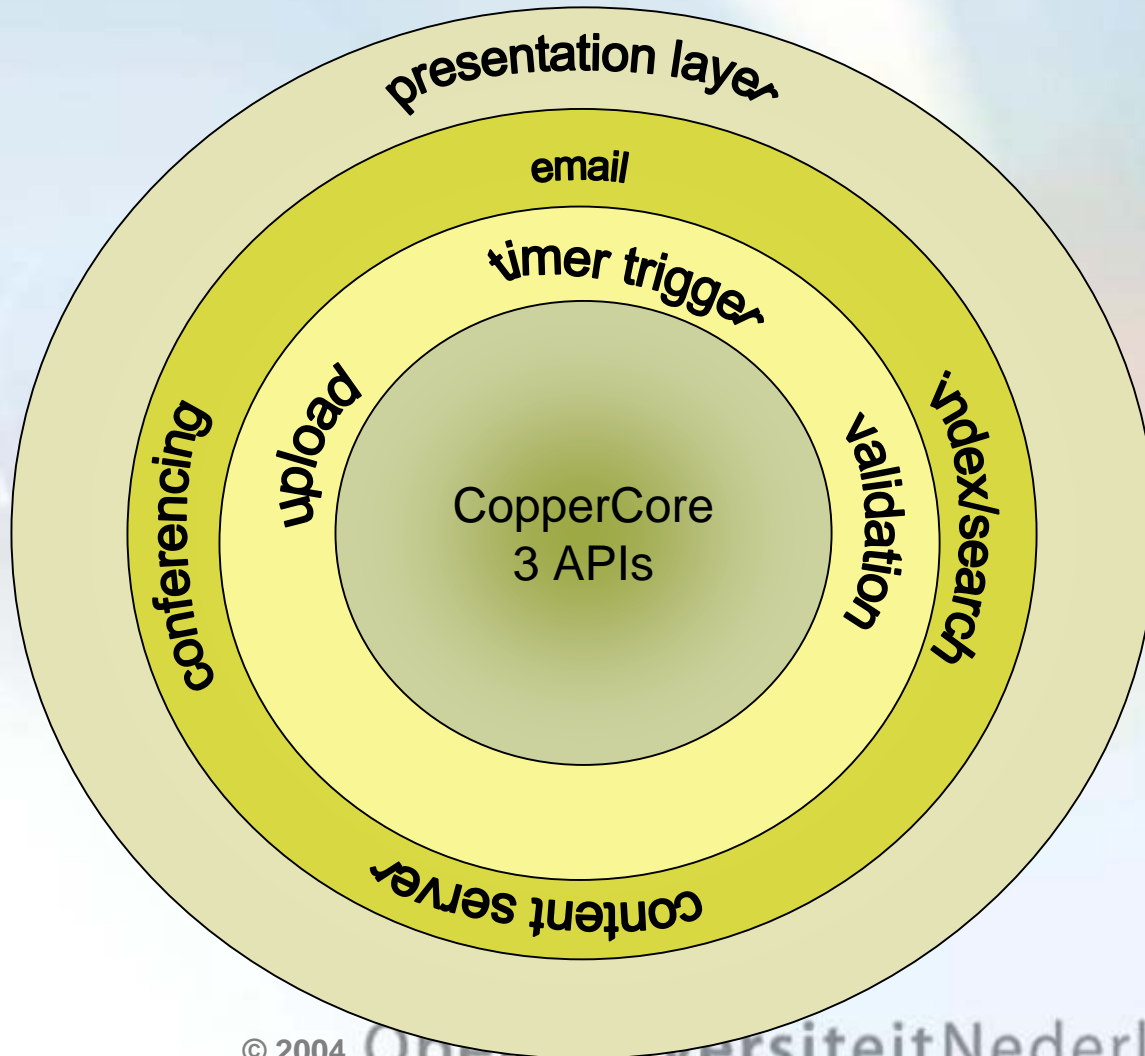
CopperCore positioning



CopperCore APIs

- CopperCore provides three API's
 - *CourseManager*: provides administrative functions
 - users, runs, roles, publications
 - *LDEngine*: provides run-time behavior
 - *activity trees, environment trees, content, completions*
 - *Timer*: triggers timed events
 - *various timed completions*
- CopperCore provides one library
 - *Validation*: provides validation routine for an LD manifest
 - *IMS LD manifest files*

CopperCore Integration



CopperCore Environment

- Developed in Java using JBuilder9, can be deployed on any J2EE application server
 - Tested: Borland Enterprise Server 5.2.1 and JBoss 3.2.1
- Can use any relational database
 - Tested with PostgreSQL 7.3 and MS SQL Server 2000
- Runs on Linux and MS-Windows
 - Tested with Windows XP/2000 and SuSe Linux (kernel 2.4.20)
- CopperCore version 1.0 available via SourceForge (<http://sourceforge.net/projects/coppercore>)
- Today: level A. Upgrading to levels B and C

Other tooling developments

- RELOAD (www.reload.ac.uk)
 - Making editors and a runtime delivery system for IMS Learning Design. Will also integrate optional use of Simple Sequencing, and also ensure that SCORM 1.3 content can be used within the runtime system.
- elive learning design suite
 - www.elive-ld.com/content/index_eng.html
- eduplone
 - eduplone.net/index_html?cl=en

Hot off the press

- Springer Verlag are going to publish a book on Learning Design written by the Valkenburg Group
 - Expected end of 2004
- OUNL and Blackboard announcement (April 2004)
 - Integration of Edubox in Blackboard's Learning System en Portal System
 - Edubox will become IMS LD-aware

Specifications update – in progress

- IMS ePortfolio v1.0
 - Link to IMS LD in having outcomes of a learning process be stored in an eportfolio, and having the contents of an eportfolio influence the learning flow
- IMS Shareable State Persistence v1.0
 - Link to IMS LD in, for example, having some aspect of the state of a simulation (amount of time to perform a part of the simulation) be used to influence the learning flow
- IMS QTiv2

Using LD+QTI together

- When are tests/assessments used in learning designs?
- Formative and summative assessment
 - “summative assessment summarises the quality and characteristics of the student.
 - formative assessment relates to students’ learning processes, helping to guide them in their studies, providing feedback on areas of learning requiring further work,”

*From “The Handbook for Economics Lecturers”,
Learning and Teaching Support Network*

Some LD+QTI learning scenarios (1)

- Single learner scenarios:
 - Want to check the learner's level of understanding before sending him/her down a particular learning path (intake assessment);
 - Want to check whether a concept has been learned before allowing the learner to progress;
 - Want to provide a high level of feedback in a module to keep motivation high;
 - Want to end a course with an examination;

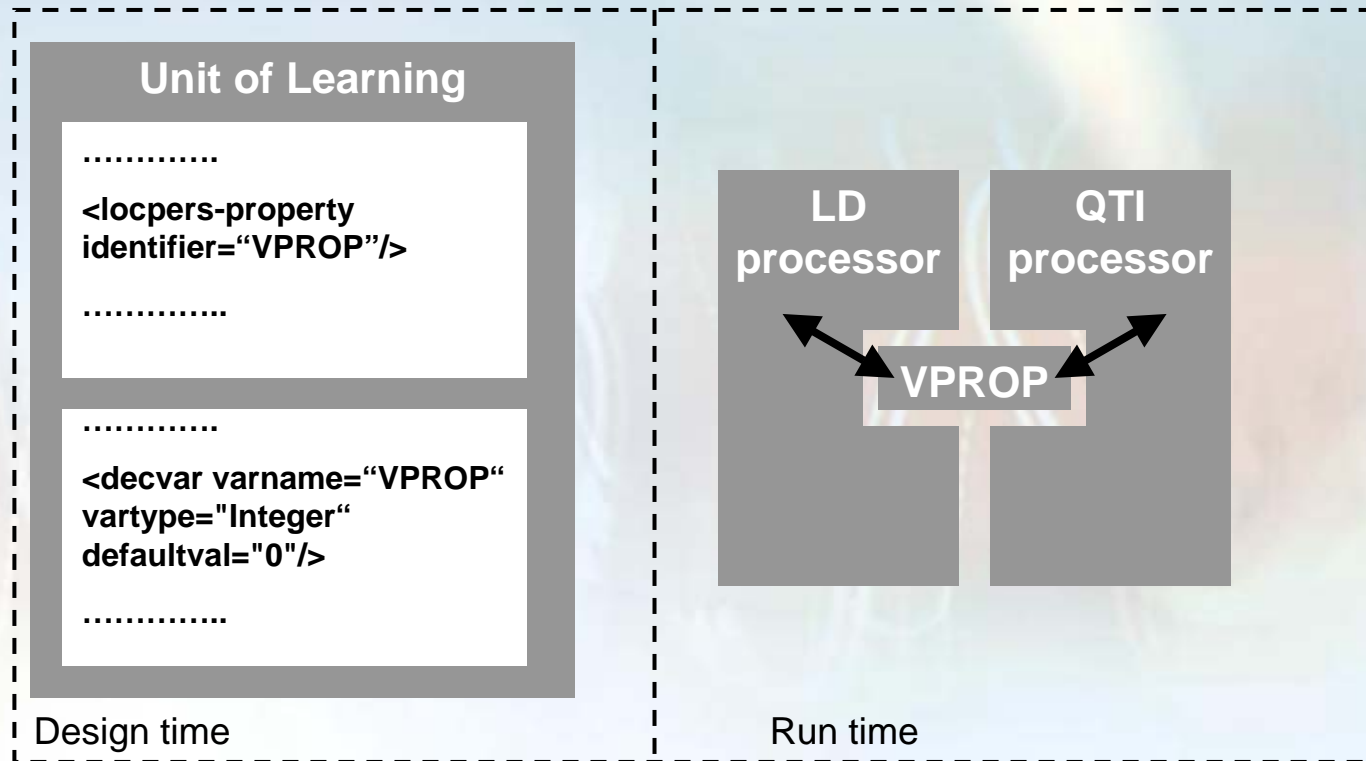
Some LD+QTI learning scenarios (2)

- Multi learner scenarios:
 - Want to have individuals' answers be revealed to a group to promote discussion and learning;
 - Want to arrange for peer assessment;
 - Want to divide a set of students into several groups of more-or-less equally able students;
 - Want to divide a group of students into groups with individuals of differing levels of ability;
 - Want to give the best/worst performer in a group a particular role in a learning design;

Have LD and QTI content share variables

- The actual tests are QTI content
- Maybe have an LD+QTI aware engine
- More likely an LD-aware engine uses a QTI-engine
- LD has properties; QTI has variables
- Need QTI and LD to 'share' eg VPROP
 - Declared by both
 - Set by QTI engine
 - Read by LD engine

QTIv2



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What did we do?

- IMS LD theory in the morning
- This afternoon's session designed to illustrate IMS LD in practice
- Many areas not handled
 - Nesting Units of Learning
 - Using IMS Simple Sequencing with IMS LD
 - Using IMS LIP with IMS LD
 - Meta-data
 - Several other topics
 - Please take advantage of the UNFOLD project to help discussing IMS LD

Why did we do it?

- To explain what the IMS Learning Design Specification is, why it was written and how you can make use of it
 - **What it is:** way of describing who should do what, with which objects and services, to achieve learning objectives;
 - **Why written:** to support holistic interoperability of e-learning content, to provide a language through which different approaches to learning can be described and compared and contrasted
 - **How to make use of it:** join us in the UNFOLD Communities of Practice, try CopperCore, monitor new tool developments, ask your vendor about LD support, ...

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